

The
MINING
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JOURNAL



February 1946

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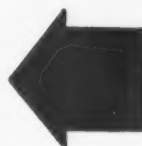
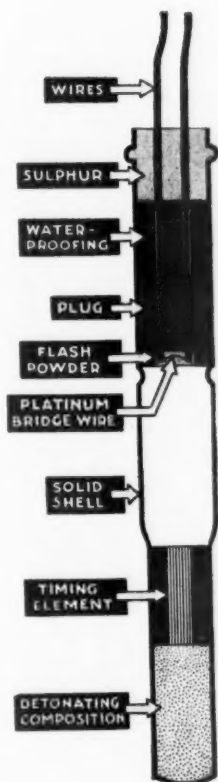


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Just one look at a Hercules "No Vent" will tell you that something important has happened to "delays." **There isn't a vent or opening of any kind in the single, one-piece, all-metal shell.**

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These are only a few reasons why Patent 1,999,820, issued to Hercules Powder Company, is important to you. For more reasons, ask any of the thousands of satisfied users of "No Vents."

★ Ordinarily, no one pays attention to patents, but this Hercules patent is important to every user of explosives, not only because it covers a revolutionary new delay electric blasting cap, but because it is significant of what Hercules is doing for better blasting.



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INCORPORATED

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The Mining Congress Journal

COMING ... for March ...

The Mining Industry and Its
Employees
Increasing Lump Coal Through
Use of Airdox
Under the Surface
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—a legislative review
Mechanization Trend
—a monthly review on modern
mining
Of All Things—miscellany
and high lights on Washington
NEWS—Men—Machines

Volume 22

FEBRUARY, 1936

Number 2

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This Journal, each and every
month, presents views of im-
portant mining men upon
national questions; upon oper-
ating practice, and mining
conditions.

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Published monthly by The American Mining Congress, JULIAN D. CONOVER, Secretary, Publisher, Munsey Bldg., Washington, D. C. Copyright, 1936, by The American Mining Congress. Entered as Second Class Mail Matter January 30, 1915, at the Post Office at Washington, D. C. Yearly subscription, United States and Canada, \$3.00; to members American Mining Congress, \$2.00; Foreign, \$4.00; Single Copies, \$0.30.

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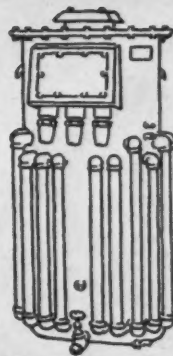
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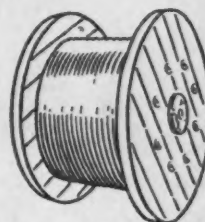
GENERAL  ELECTRIC



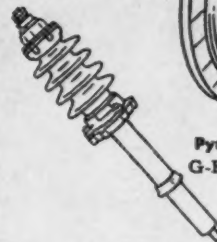
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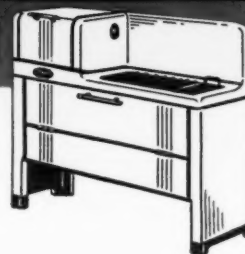
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GENERAL  ELECTRIC

The Miner and the Farmer

THE miner is dependent upon the farmer for the food which he consumes and without which he could not carry on.

The farmer depends upon the miner to furnish the basic products for the manufacturing industry, which prepares these mineral products for the market and thus obtains the money which pays the wages not only of the factory worker but of the miner, who in turn buys that part of the farm production which the farmer does not directly consume.

A good farmer can produce nearly everything required for the subsistence of himself and his family. It is because of this that farming is considered the most independent of all vocations.

What has become of the independence of the farmer?

Starvation and want do not exist with the intelligent farmer and only starvation properly calls for Federal aid. The real farmer, of whom we are all proud, does not want Government aid, and more, he will not accept it.

What the farmer cannot do for himself is to keep open a market in which he may dispose of his surplus production.

How can the Government do this? *There is no need to look for a better way than the way by which this has been done in the past.* By creating conditions under which large numbers of workmen may be employed in the manufacturing and mining industries at wages which will enable them to purchase surplus farm products. This may be a "horse and buggy way," but it is a good way and it works.

Let us examine this question from a different standpoint; in normal times farm lands within a radius of 100 miles from the city of Chicago are valued at from \$250 to \$1,000 per acre. This value is based upon the fact that these lands are so close to a market where three million mouths are to be fed and in which all surplus foods can find a ready market. The nearer to this market the land is located, the more valuable it becomes.

Let us compare these values with, let us say, Mississippi or Louisiana, where farm-land values range from \$25 to \$225 per acre. These lands are nearly if not quite as productive; they have the advantage of a much milder climate; farm stock can feed itself during the greater part of the winter and needs but little barn protection, while in the Chicago district cattle must be housed and fed from stored fodder the best part of six months in each year.

It would seem that equally fertile land in the more equable climate would be altogether the more valuable. Why, then, is it that these lands are only worth 25 percent as much? There is but one answer. The inaccessibility of an adequate home market.

If we may discover the cause or causes which were responsible for the creation of this wonderful market, we will, at the same time, discover the most practical means of helping the farmer by activities which are within the scope of Constitutional Governmental activity.

The fact of Chicago is not an accident. Its growth as a great manufacturing city came about because the combined efforts of skilled labor, stored up capital and intelligent management made possible the production of merchandise at a less cost than similar goods could be produced by competitors. Its great home market continually expanding called for a continually increasing number of workmen and a continually expanding demand for the foodstuffs produced on the farms.

New Orleans was a considerable city when the site of Chicago was a desolate marsh on an uninhabited inland lake shore. New Orleans not only had the advantage of ocean transportation, which brought the trade of the world to her door, but she also was connected by river transportation with the great Mississippi Valley, which produces half of the natural wealth of the United States.

The fundamental difference was that the southern city cultivated foreign trade instead of domestic trade. Her plans were based on slave labor, upon the sale of raw materials in foreign markets, and the purchase of her manufactured requirements in the cheapest markets of the world—that is, in the markets supplied by the cheapest of world labor.

Under a protective tariff her supplies would be more costly, therefore she favored free trade and under that system accomplished, to her, a satisfactory degree of success.

Chicago could not sell in foreign markets. She must develop local prosperity or none at all. Cheap raw materials and high-cost manufactured products furnish a basis for large employment of labor. Under that system Chicago has made a marvellous growth which has directly aided, in a magnificent way, the farmers in all tributary territory.

In seeking a means to give legitimate aid to the farmer a comparison of the history of these two cities is well worthy of consideration.

J. H. Callanath

The Mining Congress Journal



Volume 22

FEBRUARY, 1936

Number 2

E. R. COOMBES, Editor

A Journal for the entire mining industry published by The American Mining Congress

Those Who Have

IF EVERY employed person could be made to realize that he or she is contributing substantially to every person who is on relief, the spread of the present doctrine of Reform Through Legislation and Taxation would be stopped. A large percentage of our 30-billion national debt must be paid—not by the rich, because they do not have sufficient money if we confiscated it all, but by the rank and file of the employed. They will pay it by indirect taxation—upon every loaf of bread, every package of cigarettes, every piece of clothing, every amusement ticket, upon everything and sundry that goes into the process of living. It has been pointed out that if you are one of those rather usual fellows who smokes a package of cigarettes a day, you will pay to your Government in a year's time \$21.90. And that is only the beginning. "The power to tax is the power to destroy" was never more potent than today.

The Spread of the Townsend Plan

THE TOWNSEND PLAN has ceased to be a joke. While comparatively few persons really believe that the plan will become a reality, nevertheless there is a dangerously growing belief that the Government can play, successfully, the role of Fairy Godfather to the Cinderella-working (or non-working)-class. What is serious about the whole thing is the mounting belief that Government can, by magic, create plenty from scarcity.

It is quite evident that many politicians are listening to the Lorelei. Townsend clubs and groups are holding meetings with frequency, and with a fervor not unlike the good old religious camp meetings. The welcome vision of \$200 a month is being held close to the hearts of the aged, most of whom cannot be expected to rise above their need.

Senator Frazier plans to introduce a bill which recognizes the "responsibility" of the Government for the unemployed and the aged. It goes farther than the Townsend Plan and completely outclasses the Social Security Act passed last year—a law which will require thousands of employes to administer, and which will require the setting up of "emergency" reserves, with financial and political dangers that we have hardly begun to grasp. The Frazier Plan would go much further. Cost for the first year, it is said, would be five billion dollars. Thereafter, annual estimates would be

made of the amounts needed to pay compensation. He plans to finance the plan through taxes upon "high incomes, corporate surpluses and other accumulated wealth." Those eligible will include farmers, professional men, owners of small businesses, as well as those now covered by the Social Security Law. It would cover them against "all forms of disability" and would give benefits equal to the average wages in the occupation in the community.

Social Security is the aim of all deserving people. But it cannot be achieved by substituting the wishbone for the backbone.

The Door of the Supreme Court

SOCIAL REFORM of a nation through legislation is a task attempted by the present Administration. We have had legislation to force cooperation of business; and legislation designed to redistribute wealth. Legislation to "make a good boy out of Johnnie," and legislation to bring Utopia closer.

Admittedly, some of the proposals have had a laudable purpose back of them, but whether the aim of the legislation is worthy is beside the point. Reforms come from within, not from without. We cannot legislate a people into perfection; otherwise we should now be a well-nigh perfect country.

The demand by the President upon Congress to pass legislation in spite of any reasonable doubt as to its constitutionality, left most of the country in a state of bewilderment. We, as a people, have looked upon the Supreme Court as the bulwark guarding our civil liberties.

The Supreme Court is now in session. Congress obeyed the President's mandate, and the Court has before it for early decision several measures upon which there was a "reasonable" doubt. Its speedy action upon the three A's, with an adverse decision, was not totally unexpected even by the Administration. But Congress, undaunted, is aiming to solve that problem by the creation of forty-eight little AAA's. The Court has other cases before it: the Guffey Coal Law and, probably a little later, the Wagner Labor Relations Act. Dozens of New Deal Agencies are knocking at the door of the Supreme Court, seeking a verdict upon their legitimacy.

No matter how politicians may attempt to circumvent the Constitution, the Supreme Court must continue to

be our protection. If our forefathers, in outlining this great document, failed to completely visualize present-day circumstances, we have recourse to the people to amend it. Certainly it should not be attempted in Star-Chamber proceedings. The United States of America still belongs to its citizens and to no political party. The President and Congress are the chosen representatives of a people, subject to their will. They should never lose sight of that fact. The "consent of the governed" is not an idle phrase.

Debts

THE MAN in the community who spends more than he earns, who borrows to the limit of his resources, who seeks ways and means of passing on to others the responsibility for those debts, is considered a dangerous citizen and unwelcome to the community.

The nation that spends more than its possible income, that borrows to the limit upon its resources, is equally undesirable and furthermore betrays the trust that its citizens place in the form of government under which it is operating.

The Soldiers' Bonus Bill has been passed by Congress over the Executive veto. Immediate payment will increase the national debt by approximately two billions.

The spending orgy of the Administration has now placed the national debt at more than 30 billions, and it is estimated will be increased to 35 billions by 1937. Certainly one estimate is as good as another, when we attempt to visualize just how great the debt may be expanded. To 50 billions? Seventy? A hundred? One shudders at the mere mention of such astronomical figures. But this we do know, and he who runs may read: the Government is pursuing a fiscal policy which heads definitely in the wrong direction, and this fact is a direct damper upon private initiative, upon business recovery, and to that extent is limiting the number which may be re-employed by private industry.

The bonus payment is an outstanding "straw-in-the-wind" toward an even more serious evil—the apparent complete lack of effort by those in power to bring the national budget somewhere within the capacity of the people to pay.

The Stewardship of the American Mining Congress

THE AMERICAN MINING CONGRESS is rounding out thirty-eight years of service in behalf of the mineral industries. Its record is convincing and enviable. It is recognized as the national spokesman for mining, and speaks with authority upon all problems of common origin and application affecting those industries. It has just concluded its thirty-eighth annual meeting. The officers elected to guide its work are fully representative of mining. The resolutions adopted at that meeting are the foundation upon which the work of the organization rests; they are a mandate of principle and performance. Briefly, these resolutions advocate:

1. Balanced budgets, stable money, *thoughtful, well-considered* legislation confined to sound general principles, impartial administration of the law, and encouragement of private enterprise and initiative.
2. Check bureaucracy, abandon government by men and return to government by law.

3. Secure to employees freedom from coercion from all sources. Let employers and organizations of employees be subject alike to legal responsibility for their conduct and that of their agents.
4. Substitute direct relief at reasonable subsistence rates for work relief.
5. Make no changes in tariff rates through trade agreements with foreign countries without specific approval of such changes by Congress after public hearing.
6. Reduce government expenditures.
7. Balance the budget.
8. Re-establish congressional control over expenditures.
9. Use the taxing power solely to raise revenue for the necessary expense of government.
10. Deal fairly with the taxpayer in the enactment and administration of tax laws.
11. Remove from tax laws all provisions which repress and retard business enterprise, employment of workers and economic recovery.
12. Amend the Federal tax laws to re-establish the flat rate of corporation tax, to restore the right to make consolidated returns, to remove the tax on dividends received by corporations, to permit business losses of one year to be deducted from future income, to provide full allowance of capital losses, and to permit annual declaration of value for capital stock taxes, particularly in case of mining properties in the development stage.

There is no doubt that, with the cooperation of mining men throughout the country, this organization will successfully protect, upbuild and advance the cause of mining.

Go Slow With the Taxes

CALIFORNIA is in the national limelight because of the particularly drastic taxes they have levied and their program for still further taxation. Mining at one time was California's chief industry. Today it remains as a very substantial part of the state's industrial life. The industry is concerned because of the present tax proposals and does not hesitate to proclaim that if put into practice they will kill the goose and drive mining capital out of the state. A careful survey of the gold mining industry in this state indicated that a 3 percent severance tax on gold would mean that 35 percent of the gold mine operations would be closed down and some 3,000 men discharged. Since there is no other livelihood available these men would be placed on relief. This would mean that it would cost the state more to take care of these men than the state would receive as a return from the tax. This does not take into account the dealers in mine supplies who equally employ a considerable number who would be thrown upon relief. It is estimated that the value of gold production in California for 1935 was \$30,000,000, and a 3 percent severance tax would be \$900,000.

It is well that the states shall make haste slowly in taxing their industries. Otherwise, they may find themselves minus both the tax revenue and the industry.

Present Trends In Taxation*

By DONALD A. CALLAHAN†

THE present trend of taxation is away from direct general taxes and toward indirect taxes and taxes upon special groups of people and special classes of property. The entire theory of taxation has undergone a change in the minds of our people during the past 30 years. Gradually old standards have been abandoned and new concepts have been agreed to. It has been an insidious change and our people have been gradually educated in the theory that taxes can be used not only as a means of providing revenue but likewise as an instrument for bringing about social and economic equalities among our population. There is also a growing sentiment that taxation may be used to punish those who, in the judgment of the majority, have been guilty of social and economic sins.

In the days of despotism levies upon the people for the support of the crown were based upon the ability to meet the levy or upon a desire to punish or destroy. With the growth of free governments, which were built upon the right of the individual to develop himself both spiritually and materially, the power of government to levy at whim upon the possessions of the people was sharply curbed. When our own Federal Constitution was written the men who framed it sought particularly to guard against arbitrary taxation. Their own recent experience with the mother country impelled them toward this policy. And so they gave to the Congress, representative of both the sovereign states and the people themselves, the sole power to levy and collect taxes and provided that all duties, imposts, and excises should be uniform throughout the United States. They further provided that no capitation or direct tax should be laid unless in proportion to the census or enumeration which was directed to be taken. They believed that by these provisions they had forever secured the citizen against unjust levies, and based this belief upon the theory that by keeping the power of taxation within the control of the direct representatives of the people and providing for uniformity in the levies, self-interest alone would restrain excessive spending, and use of the taxing power to meet the costs of government.

These restrictions in the Federal Constitution, however, applied only to the National Government, leaving the states free within their own jurisdiction to tax their own resources, placing only beyond the reach of the state all the powers which are conferred by the people of the United States on the Government of the Union, and all the means which are given for the purpose of carrying those powers into execution. The Supreme Court of the United States has been very circumspect in interfering with state tax laws which do not interfere with the powers conferred upon the Federal Government. Accordingly, within these broad limitations, we find the states restrained only by their own constitutions and the influence of public opinion as reflected in their laws.

Over the greater period of our national existence the tendency in both the states and the nation has been to keep down public expenditures rather than to find new and legal means of raising revenue. Uniform taxation, the central theory of our Federal Constitution with relation to revenue, had a restraining influence upon spending. With the adoption of the income tax amendment to the Constitution and the passage of the laws thereby authorized, the picture began to change, gradually at first, but under the impetus of increased war expenditures violent deviation from the old policy became manifest. We shortly began to feel socially conscious and when it became evident that these social obligations could be met by levies upon a comparatively small number of people and industries, the demand for assumption of these duties by Government became more loud and determined.

Social agencies, once established, in state and nation, became active propagandists for increased grants and soon politicians began to realize that the ears of the public were more eager to listen to arguments for increased governmental activities than to the old arguments for reduced spending and less taxes. The old-fashioned statesman who loved to be characterized as "watchdog of the Treasury" began to give way to the new socially minded candidate who could paint beautiful word pictures of "Government responsibility" and outline plans of taxation which would take from the few and spend upon the many. The much-despised

"pork-barrel" Congressman, who revelled in appropriations for rivers and harbors and public buildings for his district, gave way to the new humanitarian who began writing statutes for grants to be used in the social and economic betterment of his people. The various states began to follow the example of the National Government. Counties and cities became more socially minded and all governmental agencies began gradually to build up agencies managed by trained men and women who, in the manner of all specialists, closed eyes and ears to everything but their own departmental activities and the blessings flowing therefrom.

In this program the National Government aided and abetted. The Congress many years ago began the system of grants which in these days is rapidly becoming a menace to our national, state, and local credit. It began with grants to certain colleges, a most worthy enterprise. It has progressed to a point where grants for purposes far removed from those for which a National Government was formed have become enormous. Under this system of grants providing for cooperation between the nation and the state, states, counties, and local governments have piled up mountains of debt and made capital improvements which they are hard pressed to maintain.

I am not expressing an opinion upon this change in the entire philosophy of our Government. All of this is history which is known to you, and you have a right to make up your mind upon it. I recognize the fact that a free people has the right to change its entire philosophy of government, but I believe it should not do so until it has counted well the cost of the change, not in dollars and cents necessarily, but in that more insidious and deadly thing, a letting down of the moral fibre of the people and a loss of that statesmanship which is necessary to preserve the liberties of a people. I wish to call to your attention a few of the consequences of this changed attitude toward governmental spending and the imposition of taxes to meet such expenditures.

There is no question but that this change has brought into prominence a type of political demagogue which is very dangerous. It is easy to argue for increased governmental activities when the minds of the people are no longer concerned with the cost. The ability of our Representatives in the Congress today is largely measured by the Federal funds which he can, by threats or cajolery, obtain from Congress, executive departments or bureaus to expend in his state

* Presented to 14th Annual Meeting, Idaho Mining Association.

† President, Callahan Lead Zinc Co.; director, the American Mining Congress.

or district. Our governors are kept busy seeing to it that our states get "what is coming to them" in the way of Federal funds. In fact, certain of our cities keep special representatives or "ambassadors" in Washington to look after the distribution of money to their municipalities. Our legislatures must make appropriations to match Federal funds and pass specially prepared statutes, sent them through the mails from the seat of the National Government. The power of Federal grants is rapidly destroying the sovereignty of our proudest states.

This has all brought about a condition of mind in our people which places a political premium upon extravagance on the part of both state and nation. The emperors of Rome maintained their tenuous hold upon their lofty position by liberal donations to the Praetorian Guards or the Legions. Many of our national officials are maintaining themselves in office by securing liberal grants to states, counties, and cities. In Rome the emperor trembled at the sound of marching feet of the soldiery which he had created and sustained. Our Congressmen hurry themselves to interview department heads and chairmen of committees when telegrams from state officials, chambers of commerce, and organized special groups at home begin to pile up on their office desks. Like many of the Roman emperors, they may have created the means of their own destruction.

We have reversed the ideas of the fathers that government of a free people should be a reservoir into which individual citizens should pour something of themselves for the good of all. We have reached that state where, collectively and individually, we believe that government is a reservoir from which we shall take what we can for our own benefit. We organize for that purpose, we elect men to Congress for that purpose, we choose governors and legislators for that purpose. Can you, for instance, in the coming election, imagine a candidate for office being elected on a platform of Government economy even to the extent of refusing demands of his own district for the allocation of Federal funds? Instead of that we shall witness the spectacle, I fear, of our candidates for high office refusing to condemn even the scheme of paying pensions up to \$200 a month to the aged, because Townsend clubs have been formed throughout the state and their membership is active and militant.

I have come to the conclusion, after observing these trends over a term of years, that we shall come to a socialization of all means of production in this country within a generation unless the tendency is checked. We cannot continue to demand extension of governmental functions without eventually reaching the

point where actual confiscation is necessary to meet the cost. The arguments for sharing the wealth fall easily from the tongues of eloquent demagogues and they are listened to with avidity. The political party which once argued for a full dinner pail and later for "two chickens in every pot" finds itself outbidden for public favor by spokesmen who demand a leveling, not of opportunity to earn but of the earnings themselves. The old ideal of equal opportunity for all in the race of life has been supplanted by the more alluring philosophy of equal distribution of the world's goods, regardless of ability, industry, or thrift. In the Utopia where this philosophy reigns supreme men really believe that there will be more ease, more pleasures. It is the story of cakes and circuses over again and it is useless to cite history in opposition to such a theory.

Perhaps I have deviated from the subject of taxation, but this is only seemingly. There is no answer to growth of governmental functions and extension of special activities, social and economic, save increased costs which, somehow or other, must be paid out of the produce of earth. Such increased costs in the past have led to actual confiscation, and history repeats itself. The tragedy of such events is that it is the weakest who eventually pay the full cost.

Since costs of government must be met and since demands for expenditures are increasing instead of diminishing, it is well to examine closely the receipts and

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The requisites for new or increased taxation, according to modern philosophy are:

1. An object upon which to spend the money. This object must have the support of an organized group with militant leadership and must have sufficient backing to render it politically advantageous to provide funds.
2. An object of taxation which will not affect directly a considerable number of voters, who may rise in revolt.
3. An apathetic citizenship which does not care particularly who pays the money as long as they are not directly affected, and who are willing to endorse schemes proposed by militant groups for improvement in services already rendered by government or extension of functions to better serve the people. Local pride and humanitarian impulses are the controlling factors.

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expenditures and to make comparisons with former years. While we do not want property to bear all the burden, we should examine the figures to find out whether in removing the burden from the numerous class of property owners there has not been placed upon other classes burdens, not so obvious, but tending to increase from year to year without arousing the public clamor which makes public officials nervous. Perhaps a few

comparisons will more clearly define the state financial picture.

I have chosen the state of Idaho for the comparison, and a 10-year period from October, 1924, to October, 1934. I have selected figures from official sources, using the biennial reports of the state auditor. This is what I find:

For the biennium ended September 30, 1926, the counties paid to the state ad valorem taxes amounting to \$4,728,341.86 and miscellaneous fees which brought the total to \$5,108,815.07.

For the biennium ended September 30, 1934, the counties paid to the state ad valorem taxes amounting to \$4,261,332.02 and miscellaneous fees which brought the total to \$5,007,794.81.

Thus we find that the actual receipts from taxes on property were \$467,009.84 higher in the 1924-26 biennium, while the receipts from the counties for other fees were \$365,989.58 higher in the 1932-34 biennium. The total receipts from the counties were \$101,020.26 less in the latter biennium. Distributed among the 44 counties that is a small sum for each, and divided among the individual taxpayers it is a negligible reduction.

To take the place of this sum we have had excise taxes, none of which were levied in the 1924-26 biennium. Here are some of the figures for 1932-34:

Income tax.....	\$403,172.39
Kilowatt tax.....	404,504.14
Beer revenue.....	97,390.44
Malt tax.....	23,667.73

Here we have a total of \$928,734.70 in brand new excise taxes to offset the reduction of \$101,020.26 in remittances from counties.

I have cited these figures covering a period in which each of our major parties has been in office to show the trend from direct taxes upon general property to taxes levied upon special groups or special industries. That is the tendency in both our national and state governments.

Indirect taxes, or taxes upon special groups or special classes of property, are very dangerous under our form of government. It is too easy to change rates of taxation upward when the increase will affect only a minority. Idaho state income tax is an example of this. It was a very simple matter to change the rates upward in the last legislature. The same applies to special taxes, such as the tax on electrical energy, the beer and malt taxes, and any other which ingenious revenue seekers may see fit to propose in the future. The same thing will apply to the mine tax, if it be found valid in the courts. The requisites for new or increased taxation,

(Concluded on page 57)



The Zinc Industry*

By STANLY A. EASTON †

THE fanciful story of Cinderella, and her pretty much-sought-after sisters, often finds a prototype in modern industry. In the present instance, zinc is the Cinderella I have in mind. Lead, silver and, to some extent, copper, are the much-sought-after sisters. Cinderella is the neglected sister who sat in the chimney corner, disappointed and disheartened. I shall confine my remarks almost entirely to western conditions, without taking into consideration the zinc product in New Jersey and the Mississippi Valley which, because of their expense, grade and quality, place them in a different class.

Up until the last 15 years, zinc in any ore was always considered a harmful detriment. A prospector, working on a silver-lead vein, would be discouraged and disheartened if the ore commenced to show zinc, and it seemed to be almost inevitable that many of our ore bodies, zinc and lead, both at Coeur d'Alene and elsewhere in Idaho, began to fail when the presence of zinc commenced to predominate and, in fact, certain areas in our section, particularly in the underlying Prichard slates, were considered non-workable because the ores were mainly zinc.

The success in dealing with the situation came about because of several powerfully stimulating circumstances. Probably the first circumstance was the World War. I know that during the month of June, 1913, the price of prime western zinc was .2262½, practically 23 cents a pound higher than the price we have had the last few months. It is axiomatic in industry that if you pay enough money you can get almost anything, so that this high price stimulated zinc, and afforded certain mines in the Coeur d'Alenes, selling zinc concentrates, a profit, in spite of the low grade

content of zinc, and also the high content of iron.

The second stimulation followed right after the war—the war was probably the most important, because war prices were badly needed—but the development of the selective flotation not only for the recovery of zinc and lead, but especially for the separation of the marketable products, was a most important step. Heretofore, the milling of zinc-lead ores by gravity was not satisfactory, almost impossible—the loss was terrific, and the principal objective was to get rid of the zinc so that the lead concentrates would contain a minimum of zinc, and therefore cut down the 50 cents per unit zinc penalty which the lead smelter imposed.

The flotation was first applied for the recovery of lead slime. Tailings in the old days used to run 5 and 6 percent lead, but when treated by flotation those tailings were cut down to 1 percent, and less. The next step was the selective method, by which lead and zinc were not only super-recovered from the slime, but kept separate the marketable zinc product and the marketable lead product.

So our little Cinderella commenced to be recognized, taking its place among the most popular and sought-after sisters.

In the last 20 years my company has been engaged in metallurgical research, embodying branches of its own work, and new fields which seemed promising. An organization of research men engaged in these problems, which involved not only wet concentrates, application of wet concentrates, but electrolytic work, and some fire work. The advances in the recovery and utilization of zinc-lead led up to a study of methods which would have application to the local problem. It seemed impossible that a local new enterprise could successfully compete with the older well-established zinc industries, both in the East, and in the West, in reported methods and electrolytic work. The only chance for success in this work was to do something a little different and a little better than what had already been done. Our attention was directed to certain developments first begun in South Africa, under what is known as the Leon Letrange patents, which followed the same purification method, the

use of strong sulphuric acid solutions, and high current densities in the cell room.

Prior to this time the two qualities of zinc in the market were the ordinary zinc of commerce, prime western produce by retort in the Mississippi Valley, and then there was the high grade product by the electrolytic plan, notably by the Anaconda Company and by the Consolidated in British Columbia, and elsewhere in the world.

The purpose of our investigation was the development of a method of producing zinc which would be superior in grade to any of these, uniform in quality, and which would be super-high grade. Investigation was begun in our experimental plant, and sometime in the summer or fall of 1918 Mr. Wallace G. Woolf joined our staff, and from the outset worked on this problem. He was a man of splendid metallurgical background, and had much experience with the United States Bureau of Mines, and with metallurgical plants in Utah. He has worked continuously on the work, both in the experimental stage, the exploitation stage, during the time when we were designing the plant, working out its mechanics, and finally in the creation and successful introduction of the brand of zinc which is now standard in the trade, and which has been continuously oversold during the period of depression.

Before embarking definitely on this program, Dr. Walter R. Ingalls, of New York, was engaged to act as referee, to pass upon the merits of the whole project, metallurgically and commercially, and especially to work out with the power companies a schedule for power which would be reasonably profitable to the power company, and yet enable the industry to live and prosper. Dr. Ingalls, and his assistants worked in Kellogg for some time and gave the whole project careful study, making more than one voluminous report. These were submitted to the directors of the Bunker Hill Company, and to the Hecla Mining Company. The Hecla had joined the enterprise, largely because of our equal co-ownership in the Star Mining Company, which is a very large potential producer of zinc. The result was that con-

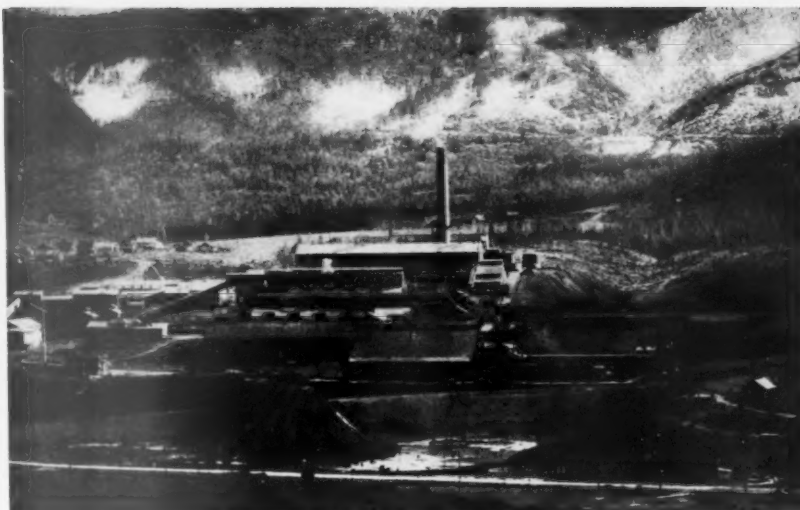
* Presented to 14th Annual Meeting, Idaho Mining Association.

† President, Bunker Hill & Sullivan M. & C. Co., Kellogg, Idaho.

struction was begun under the direction of Walter Mallette, and production of zinc began in 1928, and has continued ever since, not at full capacity, because current prices have not enabled zinc to be mined at a profit. All zinc available for this plant has come as a by-product from the mining of lead and silver ores. Recent improvements in the zinc market encourages us to believe that property from which the production is almost entirely zinc, or largely zinc, can be operated at a profit, which will enable us to resume operations at full capacity during the coming year.

All these developments have proceeded in a rather orderly way. One other factor has entered into the development of the industry—an external factor, and an important one—and that is the great demand for super-high grade zinc in the die-casting art. This is a method of producing what might be called small hardware stock, relatively small objects used in various industries, especially the automobile business. It originated in Europe, and had its present commercial application here in the United States. This industry requires an alloy with a zinc base. The articles are cast in steel dies, under high pressure, and the production is enormous when the appliances are set to work. The first die-casting plant I ever visited was in Long Island, engaged in the manufacture of garden hose connections. Formerly they were cast from brass in sand with a core, and subsequently put on a lathe for cutting the threads. Shaped and finished, male and female joint connections were being turned out at the rate of six every minute and a half. The device opened and closed, and every time it opened one of these articles was finished, ready for the market. I asked the manufacturer in charge of the plant how many he could make. He said, "I have never had an opportunity to find out. I would undertake to supply the whole world with hose connections from this plant, and if they need any on other planets, we could supply those also." This illustrates the superiority of die casting over the old hand work. The principal appliances manufactured are used in the automobile industry, that is, carburetors, gas, hub and radiator caps, windshield wipers, and many other things on the automobile. When you drive a Chevrolet, a Pontiac, or any other General Motors product, you may be interested to know that you are utilizing quite a good deal of zinc, manufactured at Kellogg, shipped to Detroit, and back to Idaho again in the form of automobiles.

Without this die casting, the uses for super high grade zinc would be not so important, but the die-casting industry is growing. They are manufacturing all manner of articles. In Chicago last winter one plant had an order for 150,000 small stew pans, and many many other articles. The alloy had to be just right. In the first place, it had to have a low fusing point. If it is too hot, then the



Bunker Hill Smelter

temperature will rapidly destroy the very expensive steel die. Also it must have certain cooling qualities, so that it will not creep, or be deformed.

Before closing, I must not omit to say that one of the by-products of the metal is cadmium, adding one more product from the mineral resources of Idaho. This is recovered from purification reduction derived from solutions before they go to the cell room. Cadmium has had a tremendous increase in popularity. The price now runs at 85 cents a pound, as against 30 cents, at which it sold for many years. Inquiries are coming from

all over the world. I have had an inquiry from China, and I have had a Frenchman in the office wanting to buy cadmium. Formerly cadmium was used exclusively for the manufacture of pigments, yellow pigments, and later it was found to be exceedingly serviceable for high speed bearings, and it is principally used in automobiles. So that from this small beginning, and from products of no value—in fact having a negative value—by a gradual process of research, advancement of practice, there have been added to the resources of output of Idaho three valuable metals.

● THE work being done by the Hecla Mining Company in opening the Polaris mine at depth, is the most important development in years in the Coeur d'Alene mining district of Idaho—the most important in fact, since the Bunker Hill and Hecla companies opened the Star ore body and built a million-dollar electrolytic plant to treat the Star zinc ores.

The Hecla company and the Newmont Mining Company of New York took over the Polaris Mining Company and have acquired, by options, lease and purchase, other property adjoining so that the combined holdings are quite extensive. The Polaris proper, adjoins the Sunshine in the so-called "dry ore" belt and Polaris silver ore seems to be similar to that of the Sunshine. James F. McCarthy, president and manager of the Hecla, was made president and manager of the Polaris.

The Polaris, years ago, was opened by rather a long tunnel which gave a depth of nearly 500 feet. The Hecla has put down a winze 920 feet from this tunnel

and at the bottom has opened a large and excellent ore body. The Hecla also acquired the Silver Summit tunnel which it is extending to get under the Polaris winze. The Silver Summit tunnel is being driven at the rate of 400 feet a month and will be under the winze by April. A 100-foot raise will connect with the winze. The Hecla will then build a mill at the portal of the Silver Summit tunnel for the treatment of the Polaris ore. It is predicted that all this enterprise will be completed and Polaris will be in production before the end of this year.

● BITUMINOUS coal production for the week ended January 25 was approximately 8,350,000 net tons. Production for the corresponding week: 1935, 8,416,000 tons; 1934, 7,259,000 tons. The report of the Bureau of Mines shows production of 8,966,000 tons for the week ended January 11, and 8,527,000 for the week ended January 18, 1936. Production calendar year to January 25, 1936, 30,706,000 tons; 1935, 30,133,000 tons.



Wheels of Government . . .

IN SPITE of the sub-zero weather, so unfamiliar to Washington, the "wheels" of Government moved ponderously on. Progress of legislative proposals was considerably slowed, but the wheels continued to grind endlessly, with old bills and new bills, and bills in the making. Congress has been occupied with many things: The bonus—the farm relief jigsaw—inflationary proposals—more taxes and greater borrowing—the threat of the United Mine Workers to disorganize the American Federation of Labor—appointments to the Federal Reserve Board—the "boycott" of the Women's Patriotic League—the launching of the Social Security Program—the decision of the Supreme Court in the case of the Three A's—and politics in general as exemplified by the pros and cons of the issues discussed by the American Liberty League.

There seems to be little doubt that the President will advocate and the Congress pass, new taxes at this session. The passage of the bonus plus the annulment of the Three A's seems to make this action more or less immediate. It is apparent that Congress is in no mood to act upon any general tax plan, and that whatever is proposed must not fall too heavily upon the low-income group.

While the real highlights of Official Washington were the Supreme Court decision and the passage of the bonus, with its tax implications, the United Mine Workers sessions have enlivened what otherwise may have been a semi-dull period for fast-moving Washington. The blasts that emanated from historic Constitution Hall as the convention dramatically approved and disapproved, involved itself in fist fights, and resolute verbosely upon the 30-hour week, and other objectives, were heard, if not "around the world," at least around the political world.

Practically nothing has been enacted—only the bonus and that over the veto of the President. The President broke all precedent by the delivery of his opening message to the Congress on Friday night, January 3. Immediately thereafter on the morning of January 6 came the decision of the Supreme Court of the United States declaring unconstitutional the

Three A law. This decision sets a precedent for further decisions in the matter of the TVA, the

Guffey Coal Act, the PWA, the Wagner National Labor Relations Act, the Public Utility Holding Company Act, and the Social Security Act. The Guffey Act is to be argued before the Supreme Court of the United States on March 11, and it is probable that there will be a decision handed down before the adjournment of the court. On the Wagner National Labor Relations Act, a hearing on the Greyhound case is set before the Philadelphia Circuit Court of Appeals for March. In Memphis, Tenn., Federal Judge John D. Martin has issued a ruling upholding the Wagner Act in denying the application of the Bemis Brothers Bag Company for a stay order, designed to prevent a scheduled inquiry of the plant for labor conditions by a representative of the National Labor Relations Board.

The Social Security Board has made available drafts of two general types of unemployment compensation laws for use by the legislatures of the states. One type contemplates the pooled fund or Wisconsin plan. The other contemplates the individual reserve plan which is the general form used in 10 states where social security statutes are now enacted. It is interesting to note that the states of Minnesota, Nebraska and Vermont have considered the social security proposals in their legislatures without passage of such legislation. In the state of Michigan, the Governor has refused to call a special session of the legislature to consider a social security enactment.

The President's budget for the coming fiscal year placed required expenses at \$6,752,000,000 exclusive of an unannounced amount for "recovery and relief." With the inclusion of processing tax receipts, the figures submitted showed a deficit of \$1,098,000,000 for the fiscal year 1937. This would make the grand total debt of the United States Government at the end of fiscal 1937 a new all-time high of \$31,351,000,000.

In appearing before an executive session of the Senate Committee on Finance, Secretary of the Treasury Morgenthau made disclosures which were publicized by Senator Couzens of Michigan. Senator Couzens said that the public debt would be in the neighborhood of \$35,500,000,000 at the end of fiscal 1937 and told the Secretary of the Treasury that he would not be bound by any requirements of secrecy. The statement which aroused Senator Couzens was that enactment of the bonus bill would in-

crease to \$11,300,000,000, the Treasury refinancing requirements of the next 17½ months. This was based, in addition to the \$2,200,000,000 for the veterans' bonus, on \$5,800,000,000 for refunding of present outstanding obligations; \$1,500,000,000 as an estimate of the deficit of the next fiscal year and an additional \$2,000,000,000 for relief.

The Pittman-McReynolds neutrality bill now reported in the House of Representatives, has been in a controversial situation in executive session of the Foreign Relations Committee of the Senate. At the present time the bill provides that the "normal amount" of "articles or materials used in the manufacture of arms, ammunition, or implements of war, or in the conduct of war" which shall govern in exports of such materials to belligerents, shall be the average shipments of such articles "during a previous period of years to be determined by the President." Announcements by congressional leaders indicate that the neutrality enactment at this session of the Congress will be confined to the re-enactment of the neutrality measure passed by the first session of the Seventy-fourth Congress in the summer of 1935.

The O'Mahoney-Mead corporation licensing bill has been discussed over a national radio circuit by Senator O'Mahoney, and Senator Wheeler has indicated that there will be hearings before the Committee on Interstate Commerce of the Senate about February 17. This bill increases the membership of the Federal Trade Commission and provides the widest powers for regulation of corporate activities including a restoration of the provisions of the 7(a) clause of the defunct NIRA.

The Walsh Government contracts bill which passed the Senate at the last session is now before the House Committee on the Judiciary with the definite possibility that it may be reported by that committee. This bill provides that any contractor furnishing materials to the various agencies of the Federal Government shall comply with requirements as to hours and wages similar to those embodied in the old NIRA.

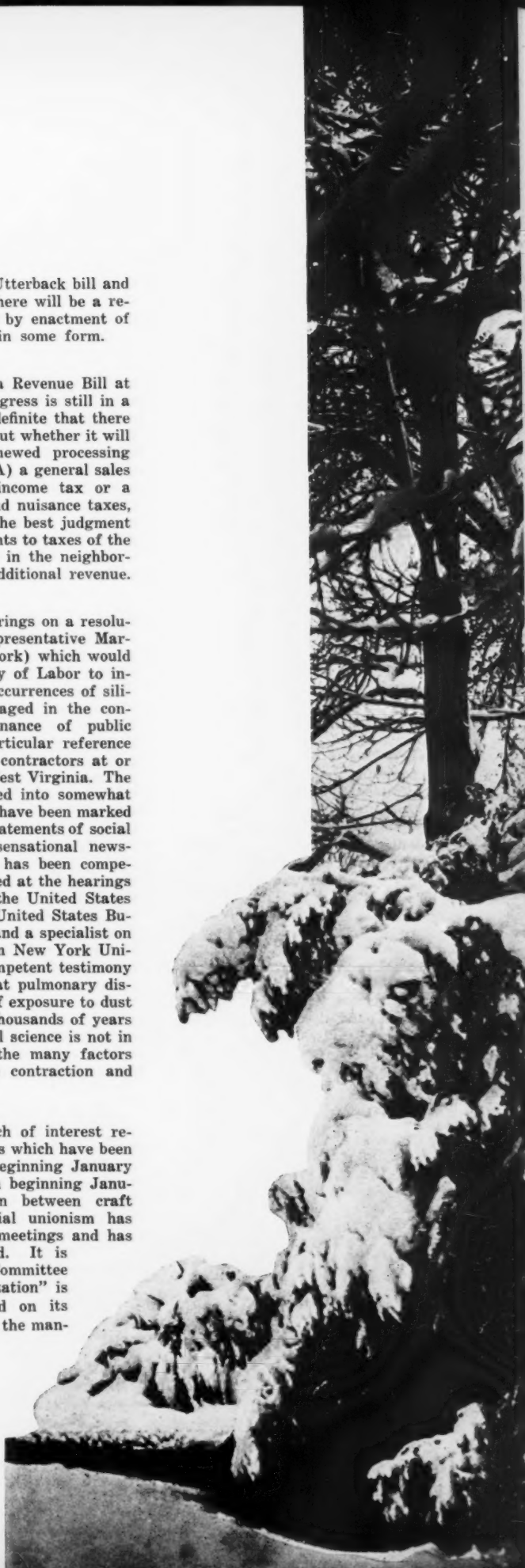
The Robinson-Patman bill which prohibits discrimination in price between purchasers, was reported by the Committee on the Judiciary of the Senate on February 3 without hearings. In the House, the Committee on the Judiciary has held hearings on a new variation of

the bill known as the Utterback bill and it is anticipated that there will be a report probably followed by enactment of the measure into law in some form.

The situation as to a Revenue Bill at this session of the Congress is still in a confused state. It is definite that there will be a revenue bill, but whether it will take the form of renewed processing taxes (such as the AAA) a general sales tax, changes in the income tax or a series of new excise and nuisance taxes, remains to be seen. The best judgment at the present time points to taxes of the latter form to procure in the neighborhood of \$700,000,000 additional revenue.

There have been hearings on a resolution introduced by Representative Marcantonio (Rep., New York) which would call upon the Secretary of Labor to investigate the alleged occurrences of silicosis in employees engaged in the construction and maintenance of public utilities. This has particular reference to a tunnel driven by contractors at or near Gauley Bridge, West Virginia. The hearings have developed into somewhat of an investigation but have been marked by grotesque hearsay statements of social service workers and sensational newspaper reports. There has been competent testimony presented at the hearings by representatives of the United States Bureau of Mines, the United States Bureau of Public Health and a specialist on industrial hygiene from New York University. All of the competent testimony pointed to the fact that pulmonary disturbances as a result of exposure to dust have been known for thousands of years but that as yet medical science is not in full agreement upon the many factors which enter into the contraction and treatment problems.

There has been much of interest recently in labor meetings which have been held at Miami, Fla., beginning January 15, and in Washington beginning January 28. The division between craft unionism and industrial unionism has been treated by both meetings and has been widely publicized. It is apparent that the "Committee for Industrial Organization" is now going to proceed on its separate way and that the management of industry can look forward to the work and influence of this committee in future years.



Old and New Uses of LEAD*

I AM afraid I shall disappoint some of my readers if they expect me to present a list of new applications of lead which use large amounts of the metal, or applications entirely unfamiliar to all of you. There are many new uses of lead, if by new we mean uses that have been principally introduced since the war, and some of them will be mentioned later, but, as this paper will endeavor to show, it is such old standbys as white lead manufacture, storage batteries and cable sheathing that continue to furnish the chief outlet for lead. Even so, two of these large uses, storage battery manufacture and the use of lead for covering telephone and power cables are comparatively new.

The twentieth century has seen some great changes in the use of lead and although it is quite true that the manufacture of white lead occupied the position of being the best market for the lead miner, until shortly after the war, this use dropped in the post-war period, generally to third place, after yielding the premier position to the manufacture of storage batteries or the manufacture of lead for cable coverings. Oddly enough, white lead manufacture is again assuming its role of being the most important market for the lead miner.

Storage battery manufacture reached huge volumes with the rapid growth in the manufacture and sale of the automobile in the United States. Unfortunately for the lead industry, the manufacture of storage batteries happens to be an outlet which does not bring about the complete destruction or loss of the metal itself. Storage batteries, as is well known, are returned to the smelter or second-hand dealer for reclamation. Upwards of 150,000 tons of lead are reclaimed each year from old storage batteries removed from some of the 25,000,000 automobiles on the roads of the United States. In other words, even though there are large numbers of storage batteries manufactured each year, they account on the whole, for only a moderate amount of new lead, and, as one commentator has put it, the lead is merely a loan to industry. The same observations may be applied to the use of lead for cable covering, the chief point of distinction being that the lead in cable coverings is buried for long stretches of time, whereas the life of the storage battery is only about two years. This is a particularly marked contrast to the use of lead in paint, where the product is entirely consumed.

* Paper presented at meeting of American Mining Congress, Chicago, Ill., September 23, 1935.

† Secretary, Lead Industries Association.

By FELIX EDGAR WORMSER†

For the ten years ending with 1930, the electric power industry of the United States expended an average of almost \$200,000,000 per year in the construction of power distribution lines. A goodly share of these purchases went to the lead producer to supply the lead necessary for covering the power conductors. In addition, during the same period, the telephone companies also made large disbursements for the rapid expansion of their own facilities. The enlargement of both the electric power generating and telephone establishments practically ceased after 1930 and the result upon the use of lead in cable construction was extremely severe. Thus the outlet for lead in cable manufacture, which grew to over 200,000 tons per year in 1929, last year accounted for only 34,000 tons. This sharp decline coincides with the simultaneous drop in the financial outlay made by the utilities for new construction, amounting to only \$65,000,000 for 1934 as contrasted with the \$260,000,000 in 1930, not to mention the negligible expenditures by the telephone companies for additional toll lines.

Looking ahead and assuming that the use of electricity will grow there is every prospect that the utilities will once again become important purchasers of lead for cable coverings and not the buyers of only about 30,000 tons per year, as at present. The use of the telephone should also increase and, if this fundamental conclusion is granted, then short of some revolutionary development in the transmission of power and telephone messages, larger amounts of lead should be called upon in the utility industries. The resumption of this buying is very important to the prosperity of the lead mining industry.

The manufacture of lead pigments consumes large amounts of lead each year, notably three pigments known as white lead, litharge and red lead. The future of the white lead industry looks promising. During the depression, the production of white lead declined steadily, but the unexcelled qualities of this paint pigment, used alone or in combination with others, and the fact that no substitutes for both white lead and linseed oil

have ever been found at all comparable with it, from the standpoint of durability and economy, make it quite likely the years to come will see a return to the use of large tonnages of white lead.

Red lead and linseed oil make the standard protective paint for iron and steel products. Here again, nothing has been discovered to displace red lead from its preeminent position.

Litharge—another lead pigment—is an unsung commercial product. I think if you were to ask a group of friends "What is the composition of litharge?" you would receive few correct answers. Litharge is one of those commodities essential to industry, inconspicuously used in important applications, which receives little credit for the valuable work it performs. It is an oxide of lead similar to red lead, although chiefly used as a paste in storage battery grids. It has numerous other important uses, such as the refining of petroleum, the manufacture of pottery, the manufacture of varnishes and cements and the manufacture of rubber. About 60,000 tons of litharge are produced each year.

Other lead pigments called to mind are orange mineral, used in making inks, basic lead sulphate, sublimed blue lead, the lead chromates and others, all of which together, account for substantial tonnages of lead consumption each year.

Recently a new pigment has been marketed, known as lead titanate, which also promises to find a place in paint manufacture. Altogether it will be seen that the lead pigment industry is highly important. Prior to the depression it required about 300,000 tons of lead annually.

When we come to consider the uses of lead in its metallic form, we are immediately struck by the multitude of its applications, some of which depend upon the easy fusibility of lead, some on its durability, some on its weight, some on its malleability and others upon its alloying properties with tin and antimony. Thus, the heaviness of lead and its low cost are used to excellent advantage in the manufacture of ammunition for war purposes and for sporting uses. The durability of lead is used to excellent

advantage in the manufacture of lead pipe and sheet lead for plumbing, in the chemical industry, or in building construction. The alloying properties of lead are used perfectly in the manufacture of solder, type metal and bearing metals. The softness of lead finds adaptation in the manufacture of foil for wrapping cigarettes and other products, or for making collapsible tubes to hold glue, shoe polish, etc.

The use of lead in building construction is worthy of special consideration. Here lead is used not alone in the actual construction of the building itself, that is, in plumbing installations or as sheet lead flashings, but is also used to protect the building after it is erected, as white lead paint, which is frequently applied to the surface.

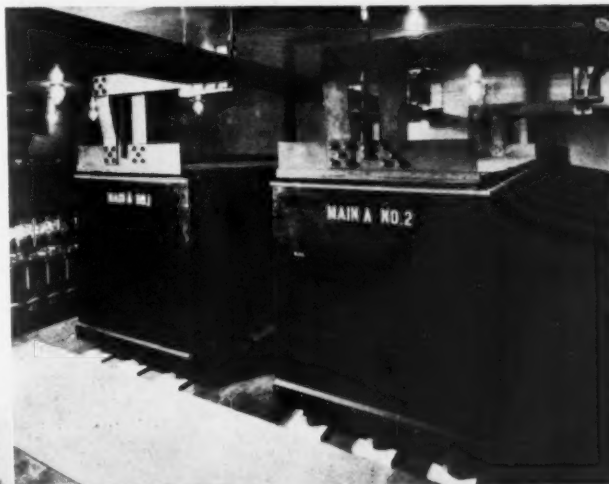
The chemical industries use large amounts of sheet lead and lead pipe, particularly where sulphuric acid is being handled, for lead has great corrosion resistance against that common chemical. Ammonia gas, sodium salts, carbonates and other chemicals are often conveyed in lead pipe.

Our market for lead that has excellent promise for development in the United States is the use of sheet lead for roofing, flashing and similar applications in building construction. This is largely owing to the development of hard lead, or antimonial lead, containing six to seven percent antimony, which has made it possible to use sheets thinner than soft lead and to make it economically wise to use this durable metal. Although sheet lead is standard for building use in Europe, its introduction here has been comparatively recent. This is not to say that sheet lead roofs, or sheet lead flashing are strange to this country. In fact, numerous examples are known of sheet

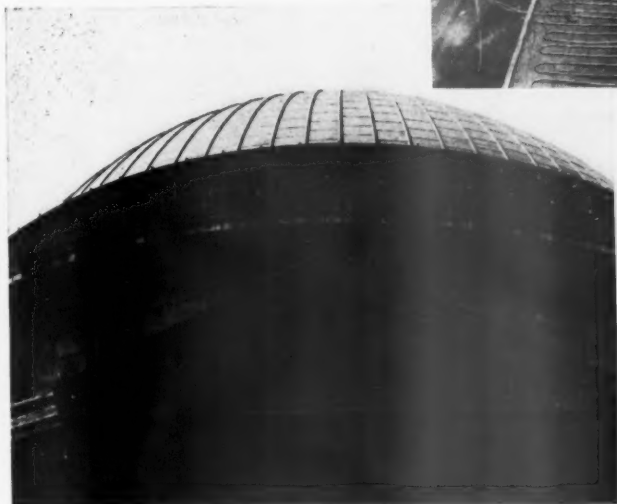
lead roofs on many fine monumental building projects in this country, the virtues of this material are widely spreading as its cost has been greatly lowered. It is to be expected that larger and larger quantities of sheet lead will be marketed to be used not only in the

layers of lead and asbestos sheets will be found under many Metropolitan skyscrapers where vibration from moving vehicles or railway trains, or machinery must be resisted. The Waldorf-Astoria Hotel, the Graybar Building, the Postum Building and the Roosevelt Hotel in New

Large lead-acid batteries providing reserve power and acting as an element in a filter to supply direct current for broadcasting apparatus at the new headquarters of the National Broadcasting Company, R. C. A. Building, New York City



Above—Lead-covered heating cable under sidewalk used to melt snow and ice



Left—Lead roof on New Jersey State Reformatory

lead work erected before the Revolutionary War, which are in excellent condition today. But they were all soft lead which has to be used in thicker sheets than hard lead and is, therefore, more expensive. Beginning with the use of hard

most expensive construction but in moderate priced homes as well.

Lead has excellent anti-vibration and acoustical properties which are becoming better understood of late. Anti-vibration pads, or mattresses, composed of

York, the Cincinnati Terminal, the new Buffalo Terminal, Pennsylvania's Philadelphia Terminal, and many other buildings might be cited as examples. These uses employ sizeable amounts of lead. For example, the Waldorf-Astoria anti-vibration pads consumed 160,000 lbs. of sheet lead.

On a small scale the principle is also used to dampen vibration of moving machinery in buildings. Thus the presses of the Herald-Tribune in New York City and the presses of other newspapers rest on lead-asbestos anti-vibration pads. Laundry machinery and rolling mill machinery afford other illustrations.

As is well known, lead does not ring when struck and this sound deadening property is used to excellent advantage in walls and doors which must be made soundproof. The broadcasting studios of the National Broadcasting Company at Radio City used doors made of laminated layers of sheet lead and wood. The field is a relatively new one for lead and possesses numerous attractive possibilities. It is quite likely that some economical means will be developed for using extremely thin sheets of lead in sound proofing. In fact reports of the success of the application abroad have already reached us.

Lead readily alloys itself with tin and other metals to furnish products of great value to industry such as solder, type metal and bearing metals, all of which are necessary to commerce. As these alloys are well known to everyone we need not dwell upon them here except to mention a few new lead alloys. For example, in bearing metal the use of a lead-alkaline earth alloy is making excellent strides where the service is particularly severe, such as in the Diesel engines in the Union Pacific and other

streamline trains, and in the United States Navy.

Another bearing metal of new application is a copper bearing high lead content product, and is used in Ford trucks, and other automobiles.

Another alloy of recent development is an alloy of lead and calcium (.03 percent) which possesses almost double the tensile strength of common lead. This alloy is being experimentally tested for cables in telephone lines and may ultimately supplant, in whole or in part, the use of antimonial lead for the same purpose, particularly on account of improved fatigue resistance.

Then again, an alloy of lead and tellurium, containing .06 percent tellurium has been invented abroad and has recently been marketed in the United States. It possesses unusually high resistance to corrosion of sulphuric acid and has the property of hardening upon being bent or worked. In fatigue resistance, the merit of the metal is remarkable. It will undoubtedly find important applications in places where its characteristics are especially valuable.

Still other recent alloy inventions are ternary alloys of (1) lead, tin and antimony and (2) lead-tin-cadmium, which are used abroad for pipe manufacture because their higher tensile strength is said to permit the use of smaller weights of metal for pipe manufacture than the use of pure lead would allow. These alloys have the composition (1) 99.25 percent lead, 0.25 percent cadmium, 0.50 percent antimony, and (2) 98.25 percent lead, 0.25 percent cadmium and 1.50 percent tin.

There are a multitude of minor uses of lead in metallic form, some of which may be new to you. For example, lead is used as a lubricant in drawing steel wire through dies. It is used in pneumatic tubes in post offices for conveying mail. It is used in the form of sheet lead as a pressure relieving joint in masonry wall construction. New devices for anchoring bolts in stone and cement walls by calking lead are being developed. It is used as tennis markers and in stair treads. In the form of a chemical compound lead—lead oleate—it will be found in certain special lubricants or greases, used in hypoid or other high pressure gear construction. Tubes for neon lights will generally contain over 20 percent lead in the form of oxides. A comparatively recent development is the use of lead covered conductor cable in heating hot beds for stimulating plant growth, or underneath sidewalks as an easy method of snow and ice removal.

Large amounts of lead are used in marine construction. For example, the Normandie is estimated to contain 800 tons of lead pipe in its construction. Caskets are also made with lead. Lead headed nails are an application using the softness and durability of lead to good advantage. Architects are finding the use of sheet lead lends itself beautifully to the construction of grilles and decorative ornamentation. Lead is also used as a coating for other metals, either

USE OF LEAD IN THE UNITED STATES *

	1920	1929	1934
White Lead	116,500	120,000	65,000
Storage Batteries	108,000	210,000	163,000
Cable Covering	79,000	220,000	34,000
Ammunition	34,000	41,000	35,000
Red Lead & Litharge	45,000	30,000	28,000
Bearing Metal	26,000	33,000	17,000
Solder	15,000	37,000	16,000
Type Metal	7,500	18,000	13,000
Foil	21,000	40,000	16,000
Other Uses	153,000	223,000	90,000
Total	605,000	972,000	477,000

* American Bureau of Metal Statistics.

alone or in combination with tin. A lead coated sheet steel is being marketed in the United States. Terne plate is a ferrous sheet metal that has been coated with an alloy of lead and about 15 percent tin. Of late, terne plate has been supplanting the use of tin plate for making cans to be used for holding industrial materials, such as paint. This substitution is, of course, brought about by the high price of tin and is a good illustration of the fact that the competitive price relationship of the non-ferrous metals has a great deal to do with where they will be used. Another lead coated product is lead-coated copper, the use of which has grown rapidly in recent years for architectural purposes. Last, but not least, is the use of tetra-ethyl lead in gasoline, which has brought about a vast improvement in motor fuel.

I think I have listed enough uses to indicate that lead is found almost everywhere and that civilization today would be at a great loss without this versatile and indispensable metal.

In summing up, I think that it can be readily shown that lead is not definitely tied up with the prosperity of any one single outlet. It is, however, essentially, one of the materials for the durable goods industries and, as these industries have been greatly depressed in the last few years, it is quite understandable that the amount of lead necessary to satisfy domestic requirements has been correspondingly small. The future of the metal, however, does not depend upon the developments of any miraculous new use which will suddenly absorb thousands of tons of the newly mined product, but rather upon recovery in those fundamental industries, such as the public utility industry and the building industry where no durable substitutes for lead have been found. That is not to say that new uses would not be welcome. In fact, some of them have appeared from time to time and now account for the consumption of fair tonnages of lead. The use of lead in ethyl gasoline is one illustration.

By and large, it will be the old and well established outlets that will provide the "bread and butter" for the lead industry. Of course, industry is constantly searching for cheaper methods of doing business and the lead industry will constantly

have to be on guard for the competitive substitution of other products for lead in its major applications. Technical research, which is just as necessary in lead as in other commodities, may also develop uses of lead that in turn will displace other products. But when all is said and done, the cheapness of the metal together with its combination of fortunate physical and chemical characteristics insure for it a future that seems very bright indeed.

LIFE BEGINS AT 65

● SOME more or less ungodly versifier has perpetrated the following outrageous rhythmical ditty on the sacrosanct Townsend plan and it is now making the rounds of our exchanges. Since permits from divers quarters have been pouring in on me to continue my poetical quotations from time to time in this column, I shall join the ranks of the scribes who believe that a good piece of doggerel should have an additional boost now and then:

Cheer up, Grandma, don't you cry,
You'll wear diamonds by and by
When the Townsend plan goes through,
How we all shall envy you.
Uncle Sam has money mills,
Made to grind out brand new bills.
He will champion your cause,
With his old-age pension laws.
You will find the poor relations
Sticking like the League of Nations;
No more worry over bills,
Butcher's duns nor doctor's pills,
No more panic over rent,
Leave that to the Government.
You can soar away full-fledged,
With the over-priv-i-legged.
Dine on squab and caviar,
Sport a streamline motor car.
When the blizzards "bliz" a bit,
Off to Palm Beach gaily flit;
Lead a life on pleasure bent,
But you must spend every cent.
Whoopee! Grandma! Keep alive,
Life begins at 65!

—Chicago Journal of Commerce.

NEW USES for COPPER*

By B. B. CADDLE †

COPPER, oldest of the metals of commerce, was first mined and used by man before the days of Menes, the first Egyptian king who reigned about 4500 B.C. Through the flight of centuries the fragments of history left to us by primitive man are fragments of copper. His copper hatchets, his knives and copper spear heads and his few crude copper appliances for toil and comfort tell us all that is known of that evolutionary period of civilization.

Historians tell us that copper was first found by a half-savage tribe that inhabited the Island of Cyprus. The metal was so useful that it became their most choice possession. They named it in honor of their Island home—the "Cyprian Metal." It has kept that name through the ages and our tongues have changed it to "copper."

It was in the last ice age in America that copper nuggets were broken off the exposed lodes in the Great Lakes regions and carried south over an area of some 70,000 square miles. The deposits were rolled around and washed down into streams. The Indians found the nuggets and like the half-savage tribe of Cyprus started hammering them into implements of war and then for commercial purposes. They make bracelets, beads, fish-hooks, needles with eyes, and other objects which had been impossible to make out of flint.

Long after this discovery the Indians found the mother deposits in the Great Lakes territory and followed the outcroppings of native copper into the earth for considerable depths. The most celebrated relic of the ancient miners is the Ontonagon copper boulder in the National Museum. Its greatest length is 3 ft. 8 in., its breadth being 3 ft. 4 in. The weight is about 3 tons. This particular boulder was known in 1766. It was removed to the National Museum in 1858 to remain there for all time as a monument to the industry of the earliest Americans.

Modern exploration into the remnants of ancient civilization discloses that copper and its alloys, brass and bronze, were closely linked with the progress of the dim ages. Copper pipe used for conveying water has been unearthed in Egyptian ruins that date back more than 5,400 years. Archaeologists have

also found in Egyptian ruins pictures of crude furnaces and bellows which reveal ancient methods of copper smelting.

Among the treasured landmarks of America's rise to national existence is the Liberty Bell, cast of bronze; and Faneuil Hall, Boston, which has a copper roof. Benjamin Franklin invented the lightning rod of copper, while Fulton had a copper boiler in the *Clermont*, the first steamship.

Without copper there would not be possible today most modern inventions which have made this the greatest age in all the history of all the world. Modern civilization would falter, for copper permeates all modern progress. In everyday life it is the agent of business and industry and the promoter of our comforts and conveniences.

There are many new uses for this age-old metal due to the fact that there are comparatively few modern inventions or new industries that do not depend on it or one of its alloys.

From the dawn of civilization on down through the ages man has exerted his ingenuity to keep water cool and to preserve food during torrid weather. Frescoes unearthed in Egypt depict slaves fanning porous jars more than 4,500 years ago. That was perhaps the first method of keeping water cool during hot weather.

The natural method of refrigeration was known centuries ago. Delving into early history, one finds that ice was used as a luxury and as a medicine by Hippocrates who descended from Aesculapius. Hippocrates was born on the Island of Cos about 460 B. C. He was considered the most celebrated of Greek physicians. His works were quoted by Plato and Aristotle.

When the early settlers came to the New World, those who settled in New England constructed ice houses and during the winter months harvested ice from lakes, rivers, and ponds. Each family had a sufficient tonnage stored away to provide for them during the long summer months and until winter again descended. Those who resided in the southlands or trekked westward to the arid territories, built cellars in the earth so that the moisture from spring water would preserve foodstuffs during the summer months.

Through rapid progress made by mod-



An interesting example of hand-tooling of sheet Copper, a popular medium for artists in metal because of its extreme workability and rich, warm appearance

ern invention, mechanical refrigeration was discovered several years ago. Today it is the "baby giant" of new industries. Operated either by electricity, gas or kerosene, millions of these refrigerators are in use in every civilized country of the world and are even in use in formerly impenetrable jungles.

When the Martin Johnsons recently left for northern Borneo to take motion pictures of wild animals and other jungle creatures in heretofore unexplored portions of that country, they took with them two mechanical refrigerators operated with kerosene, one for the preservation of foodstuffs and the other to keep their films at an even temperature.

The Johnsons will live on a giant bamboo raft moored along the banks of the Kinabatangan, the principal river of northern Borneo. This is cited as an illustration of the fact that mechanical refrigeration is being used throughout the world.

Millions and millions of mechanical refrigerators are in use not only in every country of the world, but also on steamships that ply the Seven Seas. They are utilized by hotels, restaurants, railroads, steamships, clubs, and in the home. This is one of the newer uses of copper and its alloys. It is estimated that almost 50,000,000 pounds of this metal will be consumed by American manufacturers of mechanical refrigerators during 1935.

Air conditioning is another new industry that is possible through the use of copper and copper alloys. It will consume several million pounds of these metals during the present year and that tonnage will be greatly augmented in the event of improved business conditions during 1936. It would be a rather hazardous undertaking to even predict what the potential market for air condi-

* Paper presented at meeting of American Mining Congress, Chicago, Ill., Sept. 23, 1935.
† Secretary, Copper and Brass Research Assn.



When Captain Kidd and other infamous pirates plied their nefarious trade on the Spanish Main in days of old, their ships as well as those of the Spanish galleons on which they preyed were illuminated with Copper lanterns. Because this ageless metal could not rust many such lanterns saw more than a century of service

tioning will amount to in the years to come.

When the early pioneers blazed the trail across the continent in covered wagons, they not only faced hostile tribes of Indians with whom many battles were fought, but met a more deadly foe in the intense heat of the desert country. Historians tell us that more deaths were caused by heat and bad water than by the arrows of the red men. Then came the transcontinental railroad which afforded not only much faster means of transportation but also much safer and more comfortable.

But there are few of us who years ago traveled across desert country in summer on even a crack train who have not complained of the heat and discomfort of dirt and sand sweeping into windows. Today all crack continental trains and most all others are air conditioned and the temperature can be maintained at 70 degrees F. when the mercury is flirting with the 120-degree mark outside. It is estimated that before the close of 1935 about 8,000 railroad cars will feature air conditioning. Of that number more than 5,000 cars will be air conditioned this year alone. That is nearly twice the number air conditioned since the Baltimore & Ohio placed the first modern car in service during the summer of 1930. To date more than 5,000,000 pounds of copper have been used in air conditioning railroad cars.

There are today few up-to-date and modern theaters and restaurants that are not air conditioned. Hotels are not only air conditioning their restaurants and bars, but also many of them are air conditioning rooms. Clubs are also air conditioning restaurants and bars and also many of their private dining rooms and apartments. Steamship lines have and are air conditioning their dining saloons and will soon turn to the air conditioning of staterooms.

Numerous retail stores throughout the

land are being air - conditioned, and the few dozen of air-conditioned homes will soon be augmented by many thousands, until it will only be a comparatively short space of time until the number will be counted by the hundreds of thousands.

The automobile industry has always been a large consumer of copper. The new streamline and other type models of 1935 have many important parts made of copper and copper alloys. There

has been a phenomenal expansion in the automobile market this year, with indications that more cars will be sold than perhaps in any year since the depression was first felt some six years ago. Notwithstanding the shifts of the market during the past half dozen years from one make of car to another in their relative popularity, the change in the materials used for various items, and changes in general design, the average amount of copper used in the manufacture of the typical automobile has remained most constant.

In the first eight months of the present year more than 2,800,000 cars were manufactured. That exceeds by 100,000 the total for the entire year of 1934 and is about 30 percent ahead of the total for the same period last year. With the production of new models now getting under

way rapidly, and the New York, Chicago and other shows soon to be held, it is believed that another buying wave will soon be inaugurated and that perhaps there will be a much larger number of cars sold during 1936 than during the present year. Authorities estimate that the sale of automobiles in 1935 will exceed 3,700,000 cars. From the standpoint of copper, there will be an increase in sales this year of more than 30 percent and the total copper used by the automobile industry will approximate some 200,000,000 pounds. That is a very sizeable increase over the depression low of a few years ago.

The amendments to the National Housing Act covering the extension of modernization credit for improvement, conversion or equipment of commercial properties from \$2,000 to \$50,000 is stimulating both new construction and rehabilitation of properties. The building industry has been dealt a severe blow as a result of the depression but there are signs of an early return to normalcy, with the result that it is estimated more than 160,000,000 pounds of copper will be consumed in that field during the present year. With the Federal Government exerting every effort through the Federal Housing Administration to make its Better Building Program a success, the volume of construction and remodeling during 1936 should be greatly in excess of that of the present year. The tonnage of copper in this field during 1936 should exceed 200,000,000 pounds.

There are many new uses for copper in the building field. The standard sheet weighs 16 ounces a square foot, while this new sheet weighs only 10 ounces. It is an economical roofing material and as a result an individual who wishes to use copper for roofing homes and has been somewhat hesitant in doing so because of cost will be interested in this new product. It is expected to find a very large market in the construction



There is nothing radical in the appearance of this home despite its metallic construction. Outside walls are coated with a special paint

of low cost homes and also in repairs to roofs.

Recently an electro sheet copper was invented which is being marketed at a moderate cost per pound and is being generally used for weatherproofing and dampproofing. Where basements are not adequately dampproofed, the penetration of moisture through exterior walls and floors, and the usual lack of sunlight and ventilation is apt to produce an unhealthy and humid atmosphere, which penetrates through unprotected floor construction into the living space of the house.

This new electro sheet offers a durable and inexpensive method of dampproofing. Since the walls and roof of a house are intended to provide shelter from rain and sunlight, also to protect against heat, cold, wind, dust and dampness, it is fitting to analyze the fundamentals of insulation so as to find the most economical system for efficiently weatherproofing a house.

A single ply of one-ounce electro sheet copper will provide an air-tight barrier.

This electro sheet copper is an excellent insulation material against the transference of heat or cold due to the thermal conductivity of the materials comprising the walls of buildings.

Electro sheet copper is also an excellent material for covering wooden shingles and can also be utilized for built-up roofings. As a matter of fact it is today being widely used as a built-up roofing material and has the durability of this age-old metal with low cost. It is easy to apply and has a smooth appearance.

This thin electrolytic copper is being used for interior decorations, including walls and ceilings. This material is also used for floor coverings. In fact the manifold uses for this sheet copper includes Christmas and greeting cards.

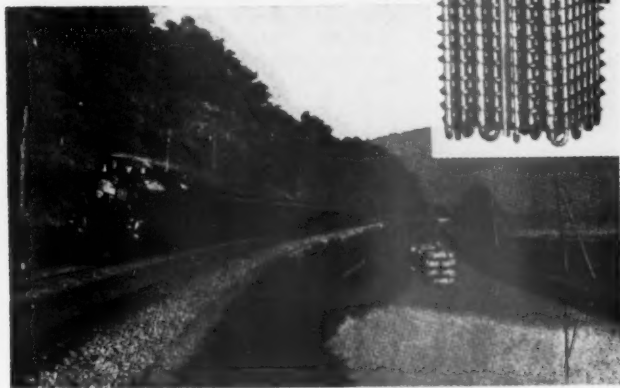
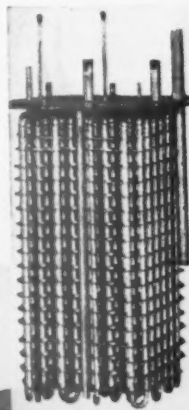
These are but a few of its present-day uses, but it will undoubtedly be used in the days to come for many other purposes, both in industry and in the arts.

In addition to the uses of copper so far mentioned in building, may be added an increased tonnage of copper for flashings, gutters and downspouts, copper and brass pipe and copper tubing for water lines, solid brass and bronze hardware and lighting fixtures, and bronze insect screen cloth. Just as building increases under the activities of FHA, just so will

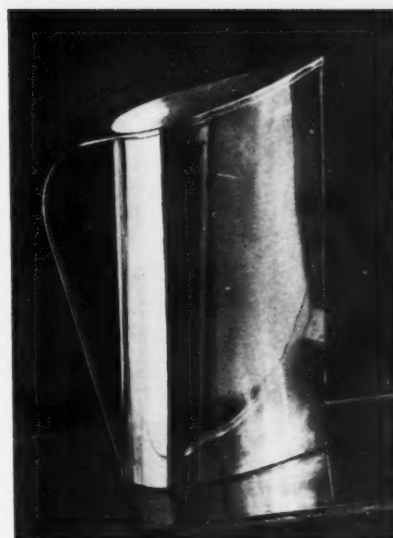
the consumption of copper and its many alloys be increased in this particular field.

Termites, a tropical insect that invaded California several years ago and became more destructive than the 17-year locusts, have spread to every state in the Union with the possible exception of the Dakotas. It is estimated by governmental authorities that these winged pests which invade many types of building, are destroying \$50,000,000 worth of property annually. Because of their destructiveness, the United States Government, through the Department of Agriculture as well as many state agricultural departments, is conducting extensive research in an effort to stamp them out, just as they devised means of combating the white ant, the Japanese beetle and other coleopterous insects.

The termite is closely related to the cockroach family. A queen can lay as many as 35,000 eggs a day. The average life of a queen ranges from 5 to 15 years. It would require considerable of a mathematician with the aid of an adding machine to arrive at an accurate total. If the little lady kept up her bating average throughout the year at the daily rate she is capable of, she would lay some 12,775,000 eggs, and if these were all hatched, each queen would certainly have a large army of offspring. The egg-laying ability of the queen is a striking illustration of how fast these insects spread and why they are spreading to every section of the United States. According to the best known authorities on termites—their prevention and control—ordinary spraying affords only temporary relief. One of the best known weapons against these insects is the placing of copper or copper alloy shields between the foundation walls and the superimposed



All-Copper brine tank coil for railroad air-conditioning.



A Normandie pitcher with brilliant, nontarnishing chromium finish over base of rustproof Copper.

them to reach woodwork. Copper cannot rust; affords permanent protection.

There are, of course, many other new uses for copper through the invention of labor-saving devices, gadgets, etc. In closing our resume we would like to tell you something of a new use for copper by an industry that consumes the smallest tonnage of metal. We were not aware of this new market until recently when we walked into a flea circus being shown on Broadway—New York's Gay White Way. Once inside the circus "big top," we found the performing fleas going through their paces very much after the manner of animals and sea mammals of the biggest show on earth. One of the big "huskies" was pulling a toy cannon across the paper, the cannon weighing five times as much as the flea, which gives you some idea of the strength of this husky little insect. The flea was harnessed to the cannon by a thin object and upon close scrutiny we discovered it was a copper wire about the size of a human hair. Becoming curious, we asked the trainer "why the copper?" and were informed that the first step in training a flea is to put a copper wire around his neck and twist it closely without choking the insect. Each flea wears a copper collar and by this means the trainer is able to put them through their tricks.

A CORRECTION

● THE EDITORIAL, "As We Face the New Year," on page 11 of the January issue of the JOURNAL, cited total U. S. production (1800-1934) of gold as more than one billion ounces; silver as 12 billion ounces; zinc as 40 billion pounds; copper as 11 billion pounds; and lead as 136 billion pounds. These figures related to world production. The United States figures are as follows: Gold, 229,301,000 ounces; silver, 3,275,891,000 ounces; zinc, 27,649,630,000 pounds; copper, 46,974,051,000 pounds; and lead, 39,015,184,000 pounds.

NEW MARKETS and USES of ZINC*

GREAT evolutionary changes have been taking place in the zinc industry in the past 20 years. These changes have been so extensive and so far reaching as to make these 20 years an outstanding period in the history of this industry.

During this time the flotation process has given the industry an additional ore supply and the fuming processes have enabled the smelters to recover zinc from products formerly considered waste. The electrolytic process has made it possible to establish zinc recovery plants in the western mining districts, which has been a direct benefit not only to the western zinc ore producers, but it has also resulted in the production of high purity metal from ore which in the past produced only common metal. The result has been to increase the supply of high purity metal which previously had been limited. Finally, near the close of this period, there has been perfected the continuous distilling smelting process. This pyrometallurgical process also produces a high purity metal, and its economy has been recognized both here and abroad. There are now a number of these continuous distilling smelting units in successful commercial operation and others are under construction.

The purity of the high grade metallic zinc (99.99+ % zinc), now produced by both the electrolytic and pyrometallurgical methods has led to the development of zinc rich alloys for die castings. These alloys, containing 93 percent to 95 percent high purity zinc metal are, to a large extent, the result of the work of the Research Department of the New Jersey Zinc Company. They possess properties never before associated with zinc in any form. By using these alloys, in the casting of metal in steel dies, it is now possible to die cast intricate, as well as simple parts, by automatic machinery, at a rate more rapid than is possible with any other method or material. Thus has zinc entered the mass production field with a product which is much stronger than cast brass, nearly twice as strong as cast iron, nearly as strong as soft steel and stiffer in thin sections.

The automotive industry is a large user of zinc alloy die castings in such hardware as door handles, hinges, radiator ornaments and other parts for the exterior and interior of the car, includ-

ing even such major parts as windshield frames and stanchions and radiator grilles. Beneath the hood there are die cast carburetors, fuel pumps, vacuum brake mechanisms and other parts.

In addition to automotive parts, there are numerous other articles which are zinc alloy die castings, such as handles and frames of many hand tools and gears, pulleys, frames, and other parts of many small power tools. Also parts of household appliances, washing machines, vacuum cleaners and electric fans are now made of zinc die casting. Many of these zinc die-cast articles are now plated or are marketed in colored finishes and we may include toys, novelties, clock cases and safety razors.

High purity metal is of increasing importance in galvanizing. It has been thoroughly established that adequate protection of steel, for long periods, can be accomplished only by zinc coatings which are thick, and when thick coatings must adhere to steel which is flexed, during fabrication or use, the coating must be of high purity zinc. Telephone wire, which must bend on its own diameter without rupture of the zinc coating, is an excellent example and corrugated culverts is another.

More exacting demands have led to the extensive use of high purity zinc in brass manufacturing because of the improved working characteristics of the brass so obtained.

Thus the production of high purity metal has resulted in new zinc products, new uses for these products and an enlargement of the field served by zinc.

Notwithstanding the development in the production of high purity metal, the production of common metal is still a very important factor in the industry as many of the well established markets for zinc are built upon and continue to use this grade of metal.

Galvanizing, the largest use of common metal, continues to consume the major portion of our zinc production and in 1934 this proportion was about 42 percent of our entire zinc metal consumption. The American Zinc Institute for the past several years has been conduct-

By RUSSELL B. PAUL†

ing an aggressive campaign to educate the consumer as to the protective value of zinc coatings and the value of using approved galvanized products. Even today, many people do not appreciate that zinc, due to any electrolytic effect, protects the steel at cut edges, scratches and other minor breaks in the coating as long as any zinc remains adjacent to the exposed area. Other protective coatings guard against rust only so long as they are unbroken. By its educational and sales promotion work, in this "Better Galvanizing Campaign," both among the producers and consumers of galvanized zinc products, the Institute is rendering substantial service to the industry to retain and expand the markets in the old established fields and to create new ones.

Evolutionary changes have also taken place in the pigment division of the industry. We now have electro thermic furnaces producing zinc oxide but the major quantity of zinc pigment is, however, still being manufactured by the old established processes. The zinc pigments, now produced, are greatly improved in the scope of pigment performance and new composite pigments have been developed to meet the expanding demands of industry. Today it is possible to produce painted surfaces, suitable for any purpose, from the established line of zinc pigments.

Zinc oxide, both the lead free and the leaded brands continue to serve as essential paint pigments and through intensive research work these oxides are being continuously improved to meet the increasing complex demands of the paint industry. Zinc oxide, in substantial percentages, is essential in a durable outside paint and its characteristics improve the washability of interior wall paints.

While the zinc oxides are essential and well established paint pigments, higher hiding power and higher covering power are secured through the use of zinc sulphide pigments.

The outstanding qualities of zinc sulphide as a paint pigment have been well recognized. The manufacturer of paint pigments as well as the manufacturer of paint has realized that in most painting

* Presented at the Metal Mining Convention and Exposition, the American Mining Congress, in Chicago, September 23, 1935.

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jobs 75 to 80 percent of the total cost of the work is labor and it has been their objective to produce a paint that will not only reduce this labor cost substantially but will also release for use or occupancy, in minimum time, the equipment or space that is idle during a paint job. This is accomplished by using paint pigments of high covering and hiding power with properly selected liquid vehicles. The desired results are obtained by applying less than the ordinary number of coatings and by quicker drying of these coatings. Zinc sulphide pigments have been developed for this purpose and on account of their high hiding and covering power and other superior qualities they are used today in greater quantities



than any other type of white paint pigment having these characteristics.

Lithopone, the original zinc sulphide barium sulphate pigment, is the best known of these zinc sulphide pigments and the most extensively used. In fact, the quantity sold is greater than that of any other paint pigment.

In addition to the ordinary lithopone, which has a zinc sulphide content of 28 percent, there are now produced higher strength zinc sulphide pigments, which have a zinc sulphide content of about 50 percent. The products of this type, made by The New Jersey Zinc Company, are known as Cryptones and the outstanding characteristic of Cryptone pigments is their exceptional high hiding power. There is a whole series of these Cryptones containing about 50 percent zinc sulphide combined with other chemical compounds to give these different classes of Cryptone pigments outstanding performance along entirely different lines. For example, there is the zinc sulphide barium Cryptone, the zinc sulphide calcium Cryptone, zinc sulphide barium titanium Cryptone and the most recent addition to this increasing important line of high strength pigments, the zinc sulphide magnesium Cryptone, which has been developed for outside paint purposes. This new compound has promising future possibilities.

Finally in considering these zinc sulphide pigments we come to the technically pure zinc sulphide which is one of the most valuable zinc pigments from the standpoint of strength and hiding power. It has been constantly improved in these characteristics and the zinc sulphide of today, which sells for nine or ten pounds to the dollar, bears little resemblance to the zinc sulphide of a few years ago, which was almost a curiosity,



Left—"Seal of Quality" sheet used by the Consolidated Aircraft Corporation in their new hangars at San Diego, Calif. Top Center—Windshield frame for a Cadillac Convertible Coupe weighs 33 pounds and is typical of the adaptability of Zinc Alloy Die Castings for applications of this size.

Lower Center—This gear is an excellent example of the accuracy and detail of Zinc Alloy Die Castings.

Right—Paint Spray Air Compressor almost completely made up of Zinc Alloy Die Castings.

and sold in the neighborhood of a dollar a pound. Today's commercial zinc sulphide has a broad range of application based upon the demands of numerous industries in addition to its well established use in exterior and interior paints.

No, I am not going to neglect to mention that today practically every rubber compound contains some zinc oxide, and that zinc compounds have been used in rubber, and allied substances such as gutta-percha since 1850.

Supplying tire manufacturers with

their necessary zinc oxide requirements is an important part of the oxide business. A great deal of research work has been done with the rubber industry for many years and is still being continued actively. Zinc oxide is used in tires to give them low heat generating qualities, good heat dissipation, high heat capacity, improved aging and good reinforcement. And there is the added factor stimulating the use of zinc oxide in rubber manufacturing which is that zinc oxide increases the effectiveness of the accelerators used for shortening the time for curing and improving the physical properties of rubber compounds.

These comments would not be complete without mentioning metallic zinc powder,



and its value as a pigment for preventing rust. When used as a pigment, in combination with zinc oxide, it has strong adherence qualities for iron and steel not possessed by the ordinary priming paints. The value of this pigment particularly for metal priming, is not yet generally appreciated.

In this brief survey of the markets and uses of zinc, I have called attention only to the broader fields served by zinc and I trust that I have not created the impression that it is at all times a highly prosperous industry, or that it is free from strenuous competition. It has its feasts and famines just as have all major industries. The margin between the ore cost, together with the manufacturing and sales costs, and the sales price of the zinc products is very narrow. Moreover, competition is keen, as competitive industries are fighting just as strenuously as the zinc industry for a place in the sun.

Zinc possesses many valuable and useful properties which, unfortunately, are not fully recognized as the metal is manufactured into innumerable products and thus loses its identity. I trust, however, that my few remarks will convey to you some knowledge of these properties and that extensive research work and effort have been required to make them available for your use.

MONTANA

MINING REVIEW

1935

By CARL J. TRAUERMAN*



DURING the past year there were a number of interesting developments in Montana's mining industry, among them being the payment of dividends by some of the smaller gold mining companies, such as the Jardine Mining Company, Little Ben Mining Company, and Standard Silver-Lead Company.

Through the efforts of the Mining Association of Montana, approximate metal production figures were obtained covering the first 10 months of 1935. According to these figures, it is indicated that the copper production had gained about 150 percent over 1934 and 60 percent over 1933. The larger gain over 1934 is due to the fact that there was a labor strike in Butte for four months during 1934.

In 1935 zinc production showed an increase of 100 percent over 1934 and about 100 percent over 1933. Lead gained 50 percent over 1934 and 100 percent over 1933. A rough estimate on the gold and silver production showed silver increased 50 percent over 1934 and 100 percent over 1933, most of the silver coming as a

by-product from the base metal and gold mines. Gold showed an increase of about 20 percent over 1934 and 70 percent over 1933.

Gold dredges were working in the placer deposits at Gold Creek and Mountain City, and a large multi-dragline is working in Alder Gulch, near Virginia City. Gold Creek operators also are sampling the large Washington Bar deposit, near Norris.

There were very few so-called company operations in this state, most of the ventures being carried on by individual operators or small groups. The East Helena smelter of the American Smelting and Refining Company received gold and silver ore shipments from over 600 individual operators, and a great many shippers sent their ores to the Washoe sampler of the Anaconda Copper Mining Company, where a very favorable rate has been established for silicious ores.

The foremost new developments in the state took place in the Little Rockies Mountains, where the Ruby Gulch Mining Company, which changed ownership during the year, is resuming operations on its low-grade gold-ore deposits, its new

300-ton mill being nearly completed. The mill was financed through the unexpected finding and shipping of a substantial body of bonanza ore.

The chief drawback to larger gold and silver production last year was the lack of capital to finance the developing and equipping of low-grade and medium-grade mines.

However, the mining industry in Montana, from the standpoint of owners, labor, etc., was in healthy condition.

Anaconda Copper Mining Company is conditioning two of its largest mines in Butte, in addition to the mines already operating, for the purpose of production when the demand increases. Neither production of copper or zinc will be increased until consumptive demand warrants, as Anaconda does not plan on increasing its inventories of metals.

Operations in the smaller camps are gradually increasing, and if capital becomes freer for mining enterprises in 1936, the production of gold and silver will increase materially, especially if prices of gold and silver maintain their present levels or advance therefrom.

● THE UNION PACIFIC COAL COMPANY, Eugene McAuliffe, president, are reopening their "D" Mine at Superior, Wyo. They are building a new steel tippie at their Reliance property, and changing to 42-inch gauge. At Rock Springs they are expanding their powerhouse by putting in two high pressure boilers, with a new 5,000 KW. unit.

* President, Mining Association of Montana.

Review of ARIZONA Mining in 1935

By CHARLES F. WILLIS*

THE mining industry of Arizona at the dawn of 1936 presents a vastly different picture than at the beginning of 1935, due, of course, to the improvement in the copper situation, the higher gold price, and the nationalized market for silver at a high price. While there is but little silver mining in Arizona, this metal is a by-product of the copper, lead, and zinc mines.

During the latter part of 1935, the copper industry has been featured by the resumption of activities at properties which have been shut down for several years and an increase in production at properties which had been able to keep going during the recent years on a meager program. Whereas the copper mines of Arizona were producing at a rate of about 15,000,000 pounds monthly at the beginning of 1935, the output at the end of the year is at the rate of about 35,000,000 pounds monthly, and is increasing.

Reduction of United States copper stocks to normal proportions; an increased market due to expansion of durable-goods industries, automobile production, and a resumption of building operations; and the passage by Congress of a two-year extension on the excise tax on foreign copper, has put the copper industry with a cheerful "Go" signal ahead, and production is being increased as rapidly as the market will absorb the metal.

All except two of the major copper properties are now operating on a substantial scale, and some of them are going virtually at capacity. While they are working on higher grade ores to offset the low metal price, most of them are profitably operating at the present market level. Copper production, however, is averaging about 50 percent capacity.

The fact that Arizona ranks fourth among the states in gold production is largely due to its copper mines where gold and silver are by-products. More than 80 percent of the Arizona gold production comes from copper mines. The low copper price has caused the copper mines to handle portions of their ore reserves with a greater gold and silver content, thus the gold and silver production are creeping upwards faster than would normally be.

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The higher gold price, however, has greatly stimulated the search for gold mines, and the production of that metal, with much success. There are many new gold producers at the beginning of 1936 which were but prospects a year ago. Mint reports show that for 1934 there

were 747 producers of gold in Arizona mines have recently resumed operations. from lode mines and 867 producers of gold from placer operations.

There have been many gold-milling plants erected during recent months which will contribute to the production of the next year. Arizona has relatively few free-milling gold properties, but many where complex sulphides with gold values are available.

A recent development in California, where chemicals are made direct from heavy sulphide mixtures of copper, lead, and zinc, with or without gold values, has provided a market for complex sulphide concentrates which was not available a few months ago. This market has led to the opening of complex sulphide properties.

The higher silver price and the promise of a continued market has caused the reopening of lead and zinc properties and particularly the production from old producers. The activity in the historic Tombstone section, which was prominent in the 80's and dormant ever since, is a notable event.

No summary of Arizona mining progress would be complete without mention of molybdenum, vanadium, and tungsten. The state has literally been combed for these metals, with the result that the year has brought forth four producers of molybdenum, two of tungsten, and two of vanadium.

Within the past few weeks some activity has started in asbestos mining, which has been dead for a long while, and the stocks of fibre that have been held in the Globe District are now pretty well cleaned up. Two of the asbestos



Open Pit Mining at Ajo, Arizona

All in all, the progress of Arizona mining during 1935 has been highly satisfactory, and the promise for 1936 is greater, for the ball is now rolling, with all factors improved and no hurdles to jump except an unfavorable tax situation. There seem to be no labor difficulties on the horizon. There have been slight labor troubles during the past year, due to the feeling that the administration would back up almost anything in this line, but no progress was made among Arizona mines.

The significant feature of Arizona mining during the latter part of 1935 has been the confidence in the future being displayed by the large copper producers, as well as the gold units, in starting improvements of a substantial nature and involving large expenditures for capital construction, something which has been utterly lacking since 1929.

Coal Handling Records

1. A BELT CONVEYOR that has carried more than 36,000,000 tons and several of the original belt sections in fair condition.

2. A cleaning plant that has washed 18,000,000 tons. (Both of these refer to bituminous coal.)

3. Five-ton truckloads of anthracite being run into Washington, D. C., from the Pennsylvania region. Can this pay, even if "bootleg" coal?

4. Tows on the three rivers in the Pittsburgh district that moved 23,000,000 tons during 1935. (Duplications not adjusted.)

ILLINOIS Coal Mining Industry in 1935

THE negotiation of a new miners' wage agreement occupied some of our attention, with numerous delays incident to the passage of the Bituminous Coal Conservation Act. A conspicuous spirit of friendly cooperation and harmony pervaded these negotiations, and the agreement, effective as of October 1, 1935, continues to March 31, 1937. With this happy labor situation, our energies were devoted almost entirely, and very properly so, to the study and amelioration of vexatious marketing and sales problems, most of which, unfortunately, are still with us.

Looking at statistics for a moment, we find that the bituminous coal production of the country in 1935, with only two or three weeks yet to be tabulated, shows an increase over 1934 of approximately 1.7 percent. Production for state of Illinois shows an increase of about 7.5 percent over last year, an encouraging fact of itself, but this little red apple of ours has a worm in it—*low realization*. History should record the period between the demise of NRA and the effectiveness of the Coal Conservation Act as the Dark Ages of Stupid Prices. Sad to relate, Illinois coals have, in a shocking number of cases, been "sold"—or, more accurately stated, disposed of—at prices often as much as 50 cents under those which were regarded as standard under NRA, thus taking not merely the hair off of some myopic operators but also painful slices of their hide as well, endangering capital structures and, also, if allowed to continue, the miners' wage levels. These events in Illinois in recent months have forcibly confirmed all those arguments heard during the protracted

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By W. J. JENKINS*

debate on the Guffey bill as to the dire need of the coal industry for a strong hand to keep it out of the abyss of ruinous competition and suicidal prices. Commodity prices and the whole cost of living have turned sharply upward, while coal continues to be marketed at a loss, or without profit, thus, as usual, bringing up the tail-end of the commercial parade. This condition is inexcusable and without the slightest justification.

The movement of Illinois coal by truck, in unprecedented volume and over incredible distances, presents a tragic problem to the industry's largest customers—the railroads—and to the established, equipped retail coal dealer. Local mines (those not having railroad connections) in our state numbered 754 in 1930, and by 1934 had increased over 55 percent to 1,175, with increase in tonnage during that period of slightly more than 60 percent. During this same period, the sale of coal by shipping mines for movement by truck showed an increase of a little more than 51 percent. The trucking problem is here to stay, and the efforts now being made to restore some semblance of orderly marketing out of existing chaos call for the unstinted support of all those in the industry who believe in holding distribution within ethical bounds and protecting the railroads, the equipped retailers, and the blind public against iniquitous practices.

The gratifying rapid increase in the use of stokers, in industries, homes, and plants of every description, provides the brightest spot in the industry. It is estimated that at least 60,000 new stokers will be installed over the country this year. Mr. Tom Marsh, eminent stoker authority, states that the stoker industry occupies, relatively, the same position that the automobile industry did in 1907. This can bring only one result—a tremendous acceleration in the use of stokers, year by year, with an attendant impact on former methods of preparing, sizing, and pricing certain types and kinds of coal. And, somewhat simultaneous with the development of stokers, has come an awakened interest on the part of the majority of coal consumers in coal and boiler-room problems. Except in more or less isolated cases, coal is no longer bought blindly—quality, size, suitability, and general performance are being accurately checked, calling for more expert salesmanship on the part of the coal producers, backed by capable combustion engineering services. These influences will undoubtedly go far in restoring coal to its rightful position of leadership against competing fuels; in fact, definite gains have already been made.

As these lines are written, Illinois and other coal-producing states are in the
(Concluded on page 39)



Chicago, Wilmington and Franklin's New Orient Mine at West Frankfort, Ill.

The COAL Industry in West Virginia in 1935

By C. E. LAWALL*

A REVIEW of conditions in the coal industry in West Virginia in 1935 shows that the past year has been one of great uncertainty for this business. It has come through a year beset with great difficulties and problems. Despite them, however, there was little change either in output of coal or in the numbers of miners employed over that of the previous year. With an estimated production of 98,000,000 net tons for 1935, compared with 98,441,233 tons mined in 1934, there appeared no general increase demand for coal over the period as a whole.

There were several periods during the year when the demand for coal was unusually active, due to prospective suspension of output while wage agreements were being negotiated, but throughout the year there was no general suspension of work due to labor troubles in the entire state, with the exception of the general strike during the last week in September, which lasted seven days.

MECHANICAL LOADING

Remarkable progress was made in mechanical mining of coal. The past 12 months have witnessed marked strides made in mechanical loading of coal and conveyor mining in most coal fields. Mechanical loaders and conveyors of all types have been at work in many mines throughout the year. Recently a new mine was opened, which will be completely mechanized. The coal will be conveyed from inside the mine to the tippie on rubber belts, which in turn will be loaded by loading machines working at the faces.

This trend to mechanical loading has necessitated some drastic changes in methods of mining and many of its disadvantages have been obviated during the year by adapting the method of mining to the machine, so that the coming year seems destined to see further developments in the mechanization of mines. Although some of the mechanical loading plans are still in the experimental stage, yet in many mines mechanical loading has been definitely established

and loading machines and conveyors of various types have been purchased and are working successfully.

PREPARATION PLANTS

Along with mechanical loading of coal, and as a natural consequence, a number of new coal-cleaning plants were built and some additions and improvements were made to cleaning plants already in use. The plants constructed during the year were equipped with various types of coal-cleaning devices; air, air-sand, Chance cones, and various combinations of these units.

The exacting market requirements for prepared sizes necessitated many improvements in tippie design and construction during the past 12 months. Some new tipples were built and many have been modernized. A number of new types of screens and improved methods of screening coal were tried out at many mines to better meet the demands for stoker coal and other prepared sizes.

The dedusting of coal by screens, by chemical and oil treating plants, progressed to a great extent during the past year, and some new plants were built to satisfy consumer demands for dustless fuel.

Much experimental work was done in the mines on the breaking down of coal. In order to obtain more lump coal, many mines tried new methods of shooting the coal, both by regular explosives and Cardox. Modifications of standard methods of shooting and mining were established at some mines and some experiments on mining long faces still continues.

Some new mines were opened throughout the year and some old mines that had been idle were reopened. In the case of new mines, there was a distinct trend to develop them for mechanical loaders and conveyors.

RIVER TRANSPORTATION

An increased volume of coal was shipped to market by West Virginia's rivers during 1935. The Monongahela River, which is one of the most important rivers of the United States, from a freight-traffic standpoint, is becoming a



significant factor in the movement of coal from northern West Virginia to market, and a pronounced gain in coal shipped by water was made in this region. A number of new docks were built on the river by coal-mining companies during the last year to ship coal from the Scott's Run and Robinson's Run fields.

On the Kanawha River some of the pools were finished during 1935, while others are still under construction in the development of a 9-ft. stage from the head of the Kanawha to the Mississippi. This river is transporting increasing cargoes of coal each year and is a very important link in the transportation of coal from southern West Virginia to markets.

MINE SAFETY

No major gas or dust explosion has occurred in the mines of the state since November 3, 1931. This record evidently is due to the close supervision that is being given the mines and a general program of rock-dusting mines which has been urged by the West Virginia Department of Mines.

There was a decided increase in the use of protective clothing among the miners of West Virginia throughout the year, which resulted in the prevention of many accidents. Hard-toe shoes, goggles, hard hats, and similar equipment all helped to reduce the number of mine accidents, and the growing use of this equipment has been an important part of the program of accident-prevention work which is continually going on throughout the whole state. Almost every working day sees the prevention of several accidents by the use of protective clothing. The miners of the state have been thoroughly convinced of its advantages and favor its use for many types of work.

(Concluded on page 58)

* Director, School of Mines, West Virginia University.

The TRI-STATE ZINC and LEAD MINING DISTRICT in 1935

THE year 1935 has been interesting and notable to the Tri-State District. It has been marked throughout by greater activity than in any year since 1930, although not all of this was constructive activity.

The last half of the year showed a marked contrast to the first half, as is evident from the figures on the accompanying table, which gives a concise picture of the industry since 1929. It is notable that the Government's subsidy to the silver producers has had less effect upon competitive zinc production from the West than might have been anticipated. The strike, of course, interrupted production on May 8, and restoration of essentially normal activities was not achieved until some two months thereafter.

The price of zinc concentrates remained uniform at \$26 during the first part of the year, but, beginning in June, moved gradually upward to \$32 in October and closed the year at the same figure. The lead concentrate price started the year at \$36 and, beginning early in June, climbed to \$47 by September and remained there to the end of the year. The value of shipments made during the last six months was nearly twice that of the first six months.

The only voluntary curtailment during the year was in effect for two weeks in January, when about half the mills were shut down; a week in October, when about a third were down; and a few days in December at Christmas time, when most of them were down. The strike shutdown was essentially complete for three weeks, but thereafter operations resumed one by one until by the middle

of July weekly production was nearly back to its former level of about 7,000 tons of zinc and 800 to 900 tons of lead concentrates. By the end of the year weekly production had increased to over 9,500 tons of zinc and 1,100 tons of lead concentrates. These figures are in net dry tons as contrasted to the commonly reported wet tons, which contain from 5 to 12 percent moisture. The maximum number of mills operated in 1935 was 62, as compared to 63 in 1934, but some mills are always dropping out and others coming into production, so the numbers are not highly significant unless one is familiar with which mills are indicated. One of the larger mills is equivalent to several small ones.

During 1934, about 4,300 men had been employed in mines and mills, mostly working a five-day week as provided under the NRA, although no Zinc Code was actually in effect, and during 1935 employment continued essentially on the same basis until the strike, which put most of the men out of work for a period of at least a few weeks. However, by the middle of July some 3,800 were back at work. In the meantime, the NRA had been voided by the Supreme Court, so working schedules thereafter generally were restored to the six-day week and daily wages were not reduced. Wages later were voluntarily increased with the increased prices, effective October 19, and remained uniform the rest of the year. By the middle of November slightly over 5,000 men were employed in mines and

mills of the district, and this was increased by approximately 200 by the end of the year.

A notable feature of the district during this year has been the increasing tailings retreatment operations. A maximum of 28 such mills was in operation during the latter part of the year, as against 23 in 1934. These mills produced 26 percent of the total zinc concentrates in 1935, as against 21 percent in the previous year. During 1936, these operations probably will reach a peak with about 35 mills with an even larger proportionate increased output. Of the new mills now under construction, one will treat about 125 tons per hour and another 100 tons, which are greater capacities than any of the older mills. Centralized milling of both mine ore and tailings has continued to expand, so that during 1935 over 50 percent of the zinc output was from such mills, as against 36 percent in 1934 and 27 percent in 1933.

The proportion of flotation concentrates is gradually on the increase. In 1935 this production amounted to 159,338 tons, or 44 percent of the total zinc output, as against 123,013 tons in 1934, which was 41 percent of the total.

Stocks of zinc concentrates throughout the year were kept well within reasonable bounds, and at the close of the year were almost the same as at the beginning—some 15,000 tons—after having reached a peak of about 24,000 the first of June. Lead concentrates began the year at 14,000 tons, reached a little over 18,000

By M. D. HARBAUGH*

* Secretary, Tri-State Zinc & Lead Ore Producers' Association.

TRI-STATE ZINC AND LEAD MINING DISTRICT—1929-1935

Compiled by Tri-State Zinc and Lead Ore Producers Association, Picher, Okla., January 7, 1936

Year	Shipments comb'd zinc and lead concentrates, tons		Avg. base price per ton, concentrates		Avg. No. mills operating			Proportion of U. S. mine production	
		Gross value	Zinc	Lead	Mine mills	Tailings mills	Total mills	Zinc	Lead
1929.....	712,935	\$34,864,645	\$42.42	\$88.59	92	22	114	42.7%	11.3%
1930.....	491,160	17,229,464	31.98	65.16	51	21	72	36.4%	6.8%
1931.....	259,395	6,472,720	22.69	44.59	24	12	36	29.2%	5.3%
1932.....	205,005	4,058,921	17.63	34.80	12	3	15	31.5%	5.0%
1933.....	292,713	8,530,561	26.90	46.79	15	6	21	35.4%	9.8%
1934.....	324,489	9,119,509	26.81	39.39	33	13	46	34.8%	9.0%
First half 1935.....	165,144	4,413,255	25.88	34.90	27	14	41
Year 1935.....	406,785	12,212,158	28.51	41.80	31	17	48	36.8%	11.0%

tons in July, and dropped below 10,000 by the end of the year.

The unwatering and reopening of a portion of the southwest Missouri field which long had been idle was a significant development in 1935. Shipments from the Oronogo District to the Eagle-Picher Central Mill began in November, and during the last few weeks of the year about 1,000 tons per day have been shipped. Other activity in the Missouri area has been considerable, a maximum of three tailing mills and three mine mills having operated at times. The year 1936 will see Missouri activities expanded, for at least three new mills are preparing to start operations there.

Prospect drilling has increased along with other activities, so that during the latter part of the year there were some 25 drills busy.

The capable field party of the U. S. Geological Survey, making headquarters at the Ore Producers Association offices, continues its work of mapping and studying the ore-bearing formations of the district for the purpose of preparing a report which, when available, should be of great value to the future of the district. A better knowledge of the geology of the ore deposits is the key to the discovery of new ore bodies on which the

life of the district depends and, therefore, on which the prosperity of most people in this district depends.

In looking forward to the ensuing year, one cannot but be impressed by the growing activity of the industry and the generally optimistic feeling among operators and workmen. While there are many uncertainties in the national political and economic picture, our industry appears to be riding along with business generally and should be able to take care of itself in spite of increasing competition from other districts which are endowed with higher grades of ores, provided it is not harassed by too many political reforms and burdensome taxes which would upset the normal competitive balance and destroy the incentive and initiative which, in this district, are responsible for the exercise of more sturdy individualism in private enterprise than yet remains in most other parts of the United States.

The past year has seen the steel industry, which is the best indicator for the zinc industry, move steadily forward, and the galvanizing business, on which the Tri-State District depends for three-fourths of its zinc outlet, has expanded greatly. The increase in tonnage of zinc used in hot galvanizing in 1935 was nearly 20 percent over that used in 1934.

Other outlets for zinc also have increased markedly during the year, so that 1935 closed with slab zinc statistics in the best position since 1929.

The "Better Galvanizing" Program of the American Zinc Institute has made great strides and has unquestionably been responsible for increasing the average zinc coating on ordinary commercial galvanized sheets as much as 25 to 30 percent. "Seal of Quality" 2-ounce coated sheets are now produced by nearly all the galvanizers, and many of the latter have become enthusiastic supporters of the Institute's program.

The recent announcement that Dr. Colin G. Fink, metallurgist of Columbia University, had discovered a commercial method of coating steel with aluminum by hot-dip process, may be of considerable interest to the zinc industry in the next few years. This may be a blow to the use of zinc in galvanizing as well as in paint. In any event, it illustrates the fact that every industry needs to be on its toes to keep abreast of its competitors. Continuous and well-directed research, both as to uses and markets, is highly essential if the Prime Western portion of the zinc industry is to maintain its general position in the economic picture.

MINING in NEW MEXICO-1935

By DR. E. H. WELLS*

THE most important metal-mining operations in New Mexico are now concentrated in Catron, Grant, San Miguel, Sierra, Socorro, and Taos Counties. Two potash mines are operating in Eddy County, and production during 1935 was no doubt considerably more than in 1934, although no statistical records of potash production are available for publication.

In Catron County the gold-silver mines of the Mogollon district, especially those operated by the Black Hawk Consolidated Mines Co., and the Cooney Mining Co., showed a large increase in total yield. Enlarged capacity of the plants and improved prices were responsible for the increase.

Grant County mines yielded mostly silver, lead, and zinc, the copper mines of the Nevada Consolidated Copper Co. having been idle throughout the year. The 250-ton mill of the Black Hawk Consolidated Mines Co. was operated on ores from the Asarco Mining Co. properties in the Central district and from its own mines at Hanover. The Peru Mining Co. continued operations at its property near Hanover. Placer mines, principally in

the Pinos Altos and the White Signal districts, continued to yield some gold.

The only important activity in San Miguel County was at the Pecos mine of the American Metal Co. in the Willow Creek district. The year 1935 was the ninth year of production for the Pecos mine, and for some time this property has been the most important producer of gold, silver, lead, and zinc in New Mexico. Production figures for 1935 will no doubt show the mine to be the leading producer of copper also, since the Chino mines in Grant County have shut down.

Sierra County's production is largely gold from the lode and placer mines of the Hillsboro district and from placer deposits in the Pittsburg district. Some copper and lead comes from the Chloride, Lake Valley, and Hillsboro districts, and a few thousand ounces of silver is annually recovered from Lake Valley ores.

An important recent activity in Socorro County is the reopening of the old Rosedale mine by Rosedale Mines, Inc. Work on the camp and surface plant and retimbering the old shaft has been progressing intermittently about two years. A Hardinge-Hadsel mill was installed early in 1935 but was dismantled several months later. A cyanide



plant is now under construction. The Magdalena district still yields an important tonnage of lead-zinc ore.

The only important mining operation in Taos County is that of the Molybdenum Corporation of America in Sulphur Gulch, near Questa. This property is one of the three largest molybdenum mines in the world, and produces several hundred thousand pounds of molybdenum a year.

There was some activity in all the other mining counties in the state, production from Colfax, Hidalgo, and Lincoln Counties being of considerable importance. Most of the yield from these counties was lode gold although a large number of smaller placer mines were exploited. Some silver, copper, and lead was also recovered.

* President, New Mexico School of Mines.

PENNSYLVANIA'S Coal Industry in 1935

By M. J. HARTNEADY*

The Anthracite Industry in 1935: While the official production figures for the year 1935 are not yet available, it is certain the production will be about 35 percent below normal and will not equal that for 1934, which amounted to 56,798,951 net tons. Based upon estimated figures received each month, it appears the production for 1935 will be somewhere around 50,000,000 net tons—slightly above that for 1932 and 1933.

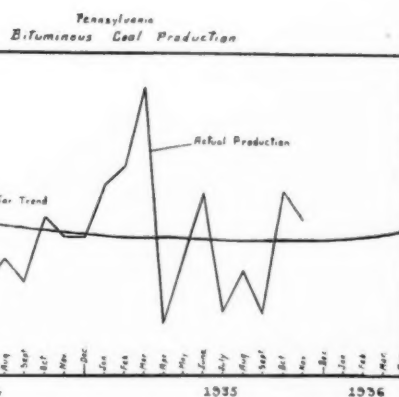
How much of this loss is due to the effect of the depression and to the competitive fuels on the one hand, and on the other to bootleg coal, which finds its way into the market from the Schuylkill section of the anthracite region, and which is not accounted for in the figures given herewith, is, of course, impossible to say, but there is sufficient indication to permit the drawing of a reasonable conclusion with respect to the future.

During the year 1935 the Anthracite Institute was reorganized and its functions were broadened and increased in number. Mr. Charles F. Huber, chairman of the board of directors of the Glen

Alden Coal Company, was made president of the Institute and immediately set out to remove many evils which tend to retard the sale of anthracite. The industry has faith in Mr. Huber's ability to place it upon a sound basis, and it is the general feeling that his efforts will result in an increase of several million tons during the year 1936.

The Bituminous Industry in 1935: The year 1935 opened with a very much improved outlook and continued so during the first three months. This, of course, can be accounted for by the threatened suspension of bituminous coal mining, as negotiations for a settlement were in progress.

During the summer months production fell below normal, and finally, during the latter part of the year, it again assumed



an encouraging outlook and shows an improvement over the last three months of 1934.

Considering all factors that have a bearing on the bituminous coal business of Pennsylvania, we forecast an improvement for 1936.

On the graph attached there is projected the bituminous production trend over the first four months of 1936.

* Pennsylvania State Department of Mines.

UTAH Mining In 1935

By A. G. MACKENZIE*

NONFERROUS metal operations in Utah in 1935 were substantially greater than in 1934, both in volume and in value. Careful estimates made in advance of the exact figures for the year 1935, which are not yet available, indicate that the increase was about one-third over 1934. Improvement in prices of copper, lead, and zinc in the last half of the year largely account for

the increased production and value, as these are the state's major nonferrous metals. The increased silver price was an appreciable factor in the augmented revenue, and considerable gold was produced from dumps and other sources that had long been inactive under the former gold price.

Several mines and plants that had been idle or on a nonproductive basis for the past three or four years resumed operations in the latter part of the year with



the addition of approximately 1,500 men to the pay rolls of the mines, mills, and smelters. New construction and renovation furnished employment for many others during part of the year.

The local expectation and hope is that the improvement will continue in 1936. The mines and plants are in excellent physical shape and in readiness to resume capacity operations on short notice.

* Secretary, Utah Chapter, American Mining Congress.

ANTHRACITE Industry 1935

By LOUIS C. MADEIRA, III *

THE anthracite industry has suffered severe losses in its markets due to reduced buying power and the competition of other fuels. While the unemployment situation is acute in certain districts where high-cost collieries have been closed down, nevertheless, taking the field as a whole, unemployment is probably no greater than in many other basic industries.

In the years 1928 and 1929 production was at a level of 70,000,000 tons per annum. The production in 1935 will approximate 70 percent of that level. By comparison with the metal mines, or even with an industry like steel, this is a very favorable showing. However, the situation would be far better if the industry had been able to readjust its situation more in line with the purchasing power of the consumer.

Three major problems in the anthracite industry press for solution with the beginning of the new year. They are the suppression of coal thievery in the mining region, the negotiation of a new wage agreement with the miners, and the merchandising of modern anthracite-burning equipment that will give a maximum of comfort with a minimum of expense and effort.

Some progress has been made in each of these directions, and with a cooperative effort on the part of operators, ship-

pers, and dealers the next 12 months should see the industry steadily improving.

During 1935, due to the inaction of the law-enforcing bodies, the "bootlegging" of coal in eastern Pennsylvania increased. By the end of the year, coal was being stolen at the rate of 4,000,000 tons a year, and more than 20,000 men were engaged in stealing, preparing, and trucking it. Late in the year, however, the problem was again pressed at Harrisburg by the owners of the coal properties, and there is reason to believe that some efficient action will be taken early in 1936 to stop this form of thievery.

The wage agreement between the anthracite operators and the miners, in effect since August, 1930, will expire April 1, 1936. While it is too early to forecast what the ultimate agreement will be, there is reason to believe that there will be no interruption of the mining program.

However, the principal element of mine cost—wages—still remains at the post-war peak of 1920, further augmented by a 10 percent increase through political intervention in 1923. A much-needed wage readjustment, in process of negotiation, was frustrated through the advent of the NIRA.

Freight rates have been reduced to points west of Buffalo and to areas affected by truck competition from the mines. In the remaining territory they

are still at a high level and add to the difficulties of meeting competition.

Distribution costs have been lowered in the so-called trucking area, but are generally maintained much on the level of the pre-depression years.

In the field of merchandising considerable progress was made last year, and this is expected to continue. Installation of automatic coal burners for homes, small apartment houses, and commercial buildings is expected to show a gain of 85 percent in 1935 over the previous year when the final figures are in.

In many cases automatic coal burners are being installed to increase the economy and efficiency of existing equipment, and in others automatic coal furnaces are being installed. A number of types are provided with a hopper that will hold several days' supply of fuel or draw it directly from the bin, and are provided with automatic ash removers that deliver the ashes into sealed cans.

Sales of automatic anthracite-burning equipment for large industrial plants in 1935 also show a gain over the previous year, but reports from several sources, including the U. S. Department of Commerce, show the greatest gain is in the smaller types.

The Anthracite Institute, through its laboratory at Primus, Pa., makes a careful scientific study of all anthracite-burning devices and gives its approval to those which are found to be satisfactory. In addition it is making independent researches to perfect further automatic anthracite-burning equipment.

Looking ahead, much remains to be done, and much can be done by reasonable cooperation on the part of those interested in the production, transportation, and distribution of anthracite. The future of the industry will be largely controlled by the attitude of labor in the negotiations of a new agreement and its willingness to recognize the economic factors that influence the mining and marketing of the product.

CALIFORNIA Mining in 1935

By G. CHESTER BROWN*

THE California mining industry during the year 1935 enjoyed a very active year, marred however with several proposed measures which, if enacted, will seriously curtail operations during the year 1936. These measures will be discussed after the year 1935 resume has been noted.

The gold production for 1935, it is estimated, will be \$30,000,000, an increase of some \$4,500,000 over the year 1934. During the year one large mining prop-

erty has been placed on production; namely, the Golden Queen, which is near Mojave, Kern County. The Brunswick mine, at Grass Valley, has been reopened and is now on production. Several small mines, such as the Ragon, at Nevada City, are being developed, and the Spring Hill, in the same district, will be producing before the first of the year.

The Soledad Mountain District, near Mojave, is one of the most active sections in the state, due primarily to the work of the Golden Queen Mining Company; some 20 leasers are proving up this section.

The following counties have shown much mining activity: El Dorado, Mariposa, Placer, Nevada, Plumas and Sierra, and also Kern and San Bernardino. The desert section—Kern and San Bernardino Counties—have been the scene of considerable prospecting, with an increase in gold production.

The outlook for the year 1936 is not so promising, not due to any fault of mining possibilities but due to such proposals as a state severance tax and an increase of 100 percent in mine compensation insurance rates for a so-called "silicosis" surcharge. The mining industry is combating both proposals. Already these proposals have been injurious as several mining companies have not exercised options on properties, so that an investment of some \$3,000,000 has been withheld pending the outcome of legislation inimical to the industry.

* Secretary-treasurer, California Metal and Mineral Producers Association.

Review of the POCAHONTAS District—1935

DURING the year 1935 coal production in the Pocahontas District amounted to slightly over 22,000,000 net tons. This is an increase over the 1934 production of approximately 1,000,000 tons, or 4½ percent. This compares with the increase in the total bituminous production in the United States of about 2 1/3 percent, while the state of West Virginia stood still in its estimated production.

About 20 percent of the production was shipped to tidewater, 15 percent to inland eastern markets, 25 percent to the lake trade, 38 percent to inland western markets, and the balance was used as railway fuel by the Norfolk & Western Railway Company, and consumed locally and at the mines.

The labor situation in the district was very satisfactory, except for a few local strikes at various collieries and the general strike during the last week of September. A total of three-quarters of a million tons of production was lost to these strikes. All of the local strikes and other labor disturbances were settled locally. It has been necessary at no time since the unionization of the district for a labor dispute case to go to the Conciliation Board.

The outstanding development of the year, so far as this district is concerned, is the realization of the sales agencies of Pocahontas coal that something should be done to hold our markets and save the industry from competing fuels, such as gas and oil. Therefore, much interest has been taken in the development of stokers, which handle Pocahontas coal satisfactorily, and one large sales agency has perfected its own stoker and is pushing its sale in the various market territories. This same sales agency has also devised and promulgated the sale of "packaged fuel," consisting of briquets of Pocahontas slack coal compressed into cubes about the size of bricks, or 4 in. by 4 in. by 6 in., for the use of small consumers and others desiring a clean, compact, and easy-to-handle fuel for grates, fireplaces, and other appliances. Even in the town of Bluefield, the "capital" of the Pocahontas coal field, where the price of coal is at a minimum, 40 stokers were installed, and in the field itself about the same number of stokers were placed.

With the realization of the sales agencies that we must "fight fire with fire," and promulgate a service with Pocahontas coal that is as automatic as oil or gas, hydro-electric, or any other

manner of producing heat, warmth, and comfort, undoubtedly the Pocahontas district will, during the year 1936 and the years to follow, produce and distribute, to say the least, its pro rata share of the bituminous production of the United States.

NEW MINES OPENED ON N. & W. RAILWAY SINCE JANUARY 1, 1933

	Last rated capacity, tons per day
<i>Tug River District:</i>	
Jacobs Fork Poca. Coal Co., Squire, W. Va.....	175

<i>Thacker District:</i>	
Buchanan County Coal Corp., No. 1, Big Rock, Va.....	1,430
Buchanan County Coal Corp., No. 2, Big Rock, Va.....	885
Virginia Lee Coal Corp., Home Creek, Va.....	370
Buchanan Smo. Coal Co., Big Rock, Va.....	175
Panther Coal Co., No. 2, Roseann, Va.....	1,840
H. E. Harman Coal Corp., Harman, Va.....	3,365
Conoway Coal Corp., Big Rock, Va.....	230

OLD MINES REOPENED ON N. & W. RAILWAY SINCE JANUARY 1, 1933

<i>Pocahontas District:</i>	
U. S. Coal & Coke Co., No. 2, Gary, W. Va.....	2,665
U. S. Coal & Coke Co., No. 4, Gary, W. Va.....	2,100
U. S. Coal & Coke Co., No. 5, Gary, W. Va.....	870
U. S. Coal & Coke Co., No. 6, Gary, W. Va.....	3,195
Lake Superior Coal Co., No. 2, Superior, W. Va.....	885

<i>Tug River District:</i>	
Kingston-Poca. Coal Co., Orkney mine, Hemphill, W. Va.....	1,335

<i>Thacker District:</i>	
Crystal Block C. & C. Co., Rawl mine, Rawl, W. Va.....	485

<i>Kenova District:</i>	
Buffalo Winifrede Coal Co., Buffalo Thacker, Chattaroy, W. Va.....	385

By W. E. E. KOEPLER*

Clinch Valley District:

Carter Coal Co., Seaboard mine, Richlands, Va.....	305
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MINES CLOSED OR ABANDONED ON N. & W. RAILWAY SINCE JANUARY 1, 1933

Pocahontas District:

Greenbrier Coal & Coke Co., McDowell, W. Va. (worked out)...	510
McDowell Coal & Coke Co., McDowell, W. Va. (worked out)...	625

Tug River District:

Fordson Coal Co., Twin Branch mine, Twin Branch, W. Va....	1,545
New River & Poca. Cons. Coal Co., No. 6, Berwind, W. Va....	1,935
New River & Poca. Cons. Coal Co., No. 7, Berwind, W. Va....	485
Slaunich Branch Poca. Colls. Co., Garland, W. Va.....	65
Pure Red Ash Coal Co., Aeger, W. Va.....	35
Vera Poca. Coal Co., No. 2, Roderfield, W. Va.....	165
Welch Poca. Coal Co., Mohegan, W. Va.....	230
Purity Red Ash Coal Co., Bradshaw, W. Va.....	25

Thacker District:

Panther Coal Co., No. 1, Panther, W. Va.....	255
Glen Alum Coal Co., No. 2, Glen Alum, W. Va.....	360
Kenner McCoy Coal Co., Williamson, W. Va.....	345

Kenova District:

Standard Thacker Coal Co., Wigarb mine, Chattaroy, W. Va.	225
Pearl Coal Co., Delbarton, W. Va.....	140
Landstreet Downey Coal Co., No. 1, Delbarton, W. Va.....	1,300
Grey Eagle Mining Co., Grey Eagle, W. Va.....	140

Clinch Valley District:

Clinchfield Coal Corp., Cranes Nest mine, Toms Creek, Va...	775
Superior Red Ash Coal Corp., Richlands, Va.....	25
Black Banner Coal Co., Bondtown mine, Coeburn, Va.....	25
Duffey Coal Co., Tacoma mine, Tacoma, Va.....	50
Commonwealth Red Ash Coal Co., Drill, Va.....	25

* Secretary, Pocahontas Operators Assn.

CURRENT ACTIVITIES of the MINING DIVISION, U. S. BUREAU of MINES*

By CHAS. F. JACKSON†

THE mining division comprises seven sections, each of which is engaged in the investigation of one or more problems that are briefly summarized below under descriptive captions.

As might be inferred from the name of the division, its principal activities are concerned with operating problems. It follows that the good will and cooperation of the mining companies must be relied upon to provide the laboratories for its investigations and that the staff must spend a large proportion of its time in the field. The personnel is composed principally of engineers who have had extensive experience in practical application of engineering to mining and in responsible charge of mining operations.

1. *Mining and Milling Methods and Costs, Metallic Ores, Eastern and Central States:*

2. *Mining and Milling Methods and Costs, Metallic Ores, Western States:*

The activities of sections 1 and 2 are similar and consist of field investigations in cooperation with mine and mill operators in various mining districts of the United States, Canada, and northern Mexico.

Several types of published reports are issued, covering the results of these investigations: Information Circulars dealing with mining and milling methods, practices, and costs at individual mines (usually under the authorship of members of the operating staffs of the companies); Reports of Investigations, covering special phases of mining and milling, by Bureau engineers; and bulletins and technical papers summarizing and analyzing information from reports on individual operations, supplemented by observations and experience of Bureau engineers.

The Information Circulars and Reports of Investigations are published within a few weeks after completion of the manuscripts. They are designed to keep operators posted on latest practices in other districts than those in which they are

operating, with a view to raising standards of practice, promoting conservation, and assisting in reduction of costs. This is of particular importance in view of depletion of our higher-grade ores and the necessity of improved technology to protect the mining industry from increased competition of foreign producers possessed of large reserves of higher-grade ores.

Some bulletins and technical papers deal with the mining and milling of ores of one or more metals and others with specific phases of mine and mill operation.

Following are some of the subjects now under investigation: Detachable rock-drill bits; loading underground with power shovels; drill-steel shop practice; aerial tramways; recent improvements in mining and milling practices at operations described in earlier Bureau of Mines publications; uses of compressed air in mining; hoisting signal systems; tailing disposal, methods and costs; transportation of mill pulps; and mill water supply.

In the Western States prospectors and operators of small mines may obtain technical advice from Bureau engineers on the development and operation of their properties. Recommendations are made as to methods and equipment. This service is designed to assist in preventing use of ill-advised methods and to promote expenditure of funds to the best advantage. It in no way conflicts with the work of independent engineers, since assistance is only given when it is apparent that an operator is unable to pay for technical help.

3. *Mining Methods and Practices, Coal:* This section serves the coal-mining industry in the same manner as sections 1 and 2 serve metal mining. Work was suspended in 1933 because of drastic curtailment in appropriations and has only recently been resumed. Some of the subjects under investigation are: Shaft bottom layouts; skip v. cage hoisting; underground transportation; "strip" mining, methods, equipment, economic ratios of overburden to coal thickness, trucks v. locomotive haulage; longwall practice in Missouri and Arkansas, hand-

loading conveyors and "scows"; steam v. electric hoists; mine-waste disposal in flat country; and shaft sinking through caving ground.

4. *Mining and Preparation of Non-metallic Minerals:* This section conducts investigations and publishes articles similar to those of sections 1 and 2 on mining practices in nonmetallic mines. As a result of four years' work, instruments have been devised and calibrated by the geophysics section that will accurately measure in ten thousandths of an inch, earth movements resulting from quarry blasting and other causes; observations with these instruments on effects of blasting have recently been initiated. Instruments are being devised along similar lines to determine the effects of air vibrations due to blasting. Recently a series of tests has been undertaken to determine size gradation of primary crusher products and another series to determine the laws of flow of bulk materials through openings of various sizes and shapes.

5. *Mine Ventilation:* This section makes mine-ventilation surveys and prepares confidential reports thereon to mine operators; investigates and issues reports on special phases of mine ventilation and general reports on ventilation in certain districts with the consent of the operators; and, in cooperation with the Experiment Stations Division and the Health and Safety Branch, has recently engaged in a study of air-conditioning and its application to mining. Little is now known concerning the latter subject, and as knowledge is gained by studies at individual mines and in the laboratory, progress reports will be issued from time to time when data of general application can be given without disclosing confidential information of the operating companies.

6. *Mineral Industries Survey:* This section has recently been formed in response to a public demand for a national inventory of our mineral industries by States. The survey involves, first, a summary of all published information on each district in a State, and, second, field studies to gather data on current rate of production, productive capacity, and employment, as a basis upon which to appraise its potentialities for future production. It is planned to publish the results separately by districts or counties as the survey of each is completed,

(Concluded on page 43)

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† Acting chief engineer, Mining Division, U. S. Bureau of Mines.

MECHANIZATION in the Coal Industry in 1935*

By L. N. PLEIN and F. G. TRYON†

A MARKED advance in the installation of both mechanical cleaning and mechanical loading equipment was made at the coal mines of the country in 1935. Complete statistics of the tonnages produced by such devices will not be available until May or June, because of the time required to canvass the 7,000 mines in the bituminous and anthracite industries. Meanwhile, however, the trend is shown by trade notices and preliminary reports of sales made by the manufacturers of equipment.

MECHANICAL CLEANING OF BITUMINOUS COAL

In 1934, the production of bituminous coal was 359,368,022 tons and of this output 11.1 percent or 39,826,559 tons were mechanically cleaned.

The important coal cleaning States, are Alabama with 78 percent of its production mechanically cleaned in 1934; Washington with 29 percent; Pennsylvania, 17 percent; Kansas (including Missouri), 14 percent; West Virginia (including Virginia), 10 percent; Colorado and Tennessee, 8 percent each; Ohio (including Michigan), 6 percent; and, Illinois and Indiana with 4 percent. This order follows the proportion of output which was mechanically cleaned. In terms of tonnage cleaned, Pennsylvania leads all other states, followed by West Virginia, Alabama, Illinois, Indiana, and Ohio.

At least 38 new installations of mechanical cleaning equipment (including entirely new plants and additions to existing equipment) were placed in operation in 1935. The list of new plants is not assumed to be complete at this writing, but nevertheless the outlook is very promising; particularly, in view of the fact that no less than eight additional installations are scheduled to be put in operation early in 1936. Evidently bituminous cleaning capacity rose considerably in 1935 and this rise is carrying forward into 1936. In all probability, the percent of production cleaned in 1935 will materially exceed the 11.1 percent recorded for 1934.

A brief review by states (discussed in the order given above) indicates that in Alabama several installations of wet tables were made late in 1934 and during 1935. This should raise the tonnage mechanically cleaned; however, in Alabama,

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† Coal Economics Division, U. S. Bureau of Mines, Washington, D. C.

TABLE 1.—SALES OF MECHANIZED LOADING EQUIPMENT AS REPORTED BY IDENTICAL MANUFACTURERS IN 1934 AND IN 1935, IN UNITS OF EQUIPMENT
(Covers sales to both anthracite and bituminous coal mines)

	Number of units		Percent change
	1934	1935	
Mobile loaders and scrapers.....	89	137	+53.9
Conveyors and duckbills.....	596	661	+10.9
Pit-car loaders.....	26	28	+ 7.7

the washeries are intimately connected with coke plants of steel companies and the preliminary estimate of production of byproduct coke in Alabama indicates a decline of 5.1 percent in 1935 compared with 1934. In Washington, two new plants started in 1935.

In Pennsylvania, one plant began operating late in 1934, additions were made to three existing plants in 1935, and three entirely new plants started up in the middle of the year. The tonnage from Pennsylvania will therefore depend on any increase in production for the State and the proportion of this increase absorbed by mines with cleaning plants. In this connection it can be stated that in past years mines in the United States equipped with cleaning plants have operated more steadily on the average than have other mines.

Kansas and Missouri should report a rise because of a new plant which started late in 1934 and another which began in 1935.

West Virginia reports two plants starting in 1934, nine new installations in 1935, and four scheduled for completion early in 1936. West Virginia has more tipples equipped with cleaners than any other State.

No new installations are reported for Colorado but one wet table installation is given for Tennessee. In Ohio, one new plant is to be completed in 1936.

Illinois is advancing rapidly to the commanding place in coal washing which it held before the war and Indiana is continuing the growth begun in recent years. The tonnage from Illinois should show a huge increase if the one large plant started in 1934 and the six large plants put in operation in 1935, operated anywhere near capacity. In addition,

three new plants are to be started in 1936. In Indiana, four new installations are reported for 1935.

It appears, therefore, that mechanical coal cleaning had a banner year in 1935, and the prospects for 1936 look favorable.

MECHANICAL LOADING

In 1934, the tonnage of bituminous coal mechanically loaded was 41,432,735 net tons. This was 12.2 percent of all the deep-mined tonnage. In the anthracite region of Pennsylvania 9,284,486 net tons were mechanically loaded, or 19.1 percent of the deep-mined tonnage. In percent of output mechanically loaded, Wyoming leads all other States with 84.1 percent of its underground production in 1934, handled by loading machines, duckbills, or conveyors. Montana follows with 79.1 percent; Indiana, 61.4; Illinois, 52.6; Utah, 24.9; Washington, 24.6; Pennsylvania anthracite, 19.1; Alabama, 11.8; Pennsylvania bituminous, 7.3; Ohio, 5.8; Virginia, 4.1; Kentucky, 1.9; and West Virginia 1.4 percent. In order of total tons loaded Illinois is far in the lead, followed by Pennsylvania anthracite, Pennsylvania bituminous, Wyoming, West Virginia, Montana, Ohio, and Alabama. Each of these States or regions produced over a million tons of mechanically loaded coal in 1934.

Such was the record for 1934. What does the available evidence indicate as to changes in 1935? What are the prospects for 1936?

Sales of equipment indicate the trend of mechanical loading in 1935. The manufacturers have courteously furnished lists of sales and the following discussion is based on a compilation of reports from the sales engineers of 28 companies. The information cannot be revealed in as

TABLE 2.—SALES OF MECHANIZED LOADING EQUIPMENT IN 1935 COMPARED WITH TOTAL NUMBER OF MACHINES IN ACTIVE USE IN PRECEDING YEARS

	No. machines in active use as reptd. by mine operators in							No. of machines sold in 1935 as reported by 28 manufacturers
	1928	1929	1930	1931	1932	1933	1934	
<i>Bituminous mines:</i>								
Mobile loading machines.....	397	488	545	583	548	523	534	129
Scrapers	130	126	150	146	128	93	119	
Pit-car loaders.....	1,040	2,521	2,876	3,428	3,112	2,453	2,288	23
Duckbill and other self-loading conveyors.....	82	99	140	165	159	132	157	† 306
Hand-loaded face conveyors—								
1. Number of conveyor units.....	*	*	*	*	*	525	574	† 59
2. Number of mines at which used.....	119	130	142	152	136	114	114	
<i>Anthracite mines (Pennsylvania):</i>								
Mobile loading machines.....	302	350	384	5	11	18	14	8
Scrapers				457	479	455	517	
Pit-car loaders	184	355	421	28	24	19	25	5
Duckbills and other self-loading conveyors.....				1	17	12	13	
Hand-loaded face conveyors, number of units.....				547	818	940	1,338	† 354

* Number of units not reported in these years.

† Reported as "conveyors (room, face, and entry)," "shaker drives," and duckbills.

‡ Represents number of bituminous mining companies to whom conveyors were sold in 1935. Of these, 12 companies were mining with conveyors in 1934 and 47 were not.

much detail as might be desired because the report of each manufacturer is considered to be confidential. The totals, however, are of great interest.

Table 1 compares sales made by identical manufacturers who reported both for 1934 and 1935. By far the largest increase was reported in the class of mobile loaders and scrapers. Manufacturers of these types sold 137 units in 1935 as against 89 in 1934, an increase of 53.9 percent.

Sales of conveyors and duckbills likewise showed a substantial increase. These two types of equipment are grouped together to avoid disclosure of individual business, and the numerical count is arrived at by reckoning each piece of equipment sold (i.e., every entry, room, and face conveyor, shaker drive, or duckbill) as one unit. Sales by identical manufacturers rose from 596 units in 1934 to 661 units in 1935, an increase of 10.9 percent.

Sales of pit-car loaders increased 7.7 percent in 1935 compared with 1934.

Table 2 shows how the number of units sold during 1935 compares with the number in actual use in 1934 and earlier years, separating the anthracite and the bituminous coal mines. It will be seen that both the hard and soft coal fields purchased substantial additions to their existing equipment in 1935, the types of machines selected varying with conditions. Outstanding features of the year were the spread of the heavier types of equipment, especially the mobile loader, in the bituminous coal fields, and the installation of conveyors (and duckbills) in both bituminous and anthracite mines. Of the pit-car loaders sold, 23 went to bituminous mines and 5 to anthracite.

In considering these indicators, it should be kept in mind that some of the sales undoubtedly were replacements for worn out or obsolete machines. Many of the devices were installed late in the year and therefore will have little effect on the amount of coal mechanically

TABLE 3.—COMPARISON OF MOBILE LOADERS AND SCRAPERS IN ACTUAL USE IN 1934 WITH SALES REPORTED IN 1935, BY STATES

State	In use in 1934			Sales of mobile loaders and scrapers reported in 1935	Indicated increase percent
	Mobile loaders	Scrapers	Total		
<i>Bituminous</i>					
<i>Northern States</i>					
Pa., Ohio, Ind., Ill.....	428	55	483	77	+15.9
<i>Southern States</i>					
W. Va., Va., Ky., Tenn., Ala....	15	28	43	41	+95.3
<i>Western States</i>					
Ark., Colo., Mont., New Mex., N. Dak., Okla., Utah, Wyo...	91	36	127	11	+ 8.7
Total bituminous.....	534	119	653	129	+19.8
<i>Pennsylvania anthracite</i>	14	517	531	8	+ 1.5

TABLE 4.—COMPARISON OF DUCKBILLS AND HAND-LOADED FACE CONVEYORS IN ACTUAL USE IN 1935 WITH SALES REPORTED IN 1935, BY STATES *

State	In use in 1934			Sales of duckbills and hand-loaded face conveyors in 1935	Indicated increase percent
	Duckbills and other self-loading conveyors	Hand-loaded face conveyors	Total		
<i>Bituminous</i>					
<i>Northern States</i>					
Pa., Ohio, Ind., Ill., Md.....	15	300	315	90	+28.6
<i>Southern States</i>					
W. Va., Va., Ky., Tenn., Ala....	5	178	183	136	+74.3
<i>Western States</i>					
Ark., Colo., Mo., Mont., Utah, Wash., Wyo.	137	96	233	80	+34.3
Total bituminous.....	157	574	731	306	+41.9
<i>Pennsylvania anthracite</i>	13	1,338	1,351	354	+26.2

* The figures of number in use in 1934 are not exactly comparable with the number sold in 1935, because of uncertainties in defining what constitutes a conveyor. The comparison, however, will serve to indicate which regions have made the largest proportionate increases.

loaded in 1935. This factor, however, is offset to some extent by machinery installed late in 1934, but which had the opportunity to operate for a full year in 1935. Another point to bear in mind is

that mechanical loading when first installed at a mine involves a certain amount of experimentation and full efficiency is not attained at the start.

(Concluded on page 57)

MINING METHODS

in CENTRAL PENNSYLVANIA*

I AM not sufficiently familiar with all the systems of mining used in the Central Pennsylvania Bituminous field to discuss them in detailed manner, however, I do have a general impression of what is being done. In my opinion, more than 90 percent of the mining operations in this field use the room and pillar system of mining or modification of this system.

In contemplating the origination of questions relative to such mining systems as we do have, the first question is, "Just what do we mean by a mining system?" Do we just have in mind the most prevalent type, without consideration of the other involved factors? Is it sufficiently informative to say of a particular mining operation that "They use the room and pillar system?" I believe not. Such a term does not convey to the mind the true picture, for instance, of a large operation using this system, but employing multiple main and panel headings with, perhaps, multiple room headings. Our mining nomenclature needs revision to convey a clearer picture of present day mining methods. Questions should not be merely academic in character and postulated on hypothetical grounds. They should be as practical as possible and they should be rooted in problems that still, for us, remain unsolved. I am sure that for all of us enough problems still remain unsolved to furnish us with sufficient matter for serious discussion for a long time to come.

Let us assume that most of our mining operations are carried on by the room and pillar method with some isolated modifications which we can, for the present, ignore and let us confine our discussion to it alone. Mining operations employing the room and pillar system use one form of attack at one mine and in a contiguous operation may use an attack that is different and the result may be favorable in the first case and unfavorable in the other, or vice versa.

To describe the simplest type of the room and pillar system: we may have, because of size and shape of property, other factors such as equipment at hand, development by means of a main heading, with room headings turned right or left, or both directions, with rooms driven therefrom, perhaps to property limits.

* Presented to Conference of the Operators Committees of the American Mining Congress at Pennsylvania State College, October 4, 1935.

† Monroe Coal Mining Co.

By A. E. ROBERTS†

Pillars may be recovered advancing or on the retreat. Again the room headings may be driven to the property limits, rooms excavated and pillars recovered with some sort of continuity with respect to that particular block of coal, but not with respect to contiguous blocks.

At the other extreme, we have properties of large acreage and production where the main body of the coal is invaded by main headings in a group of 4 to 8 parallels. From these main headings are turned at intervals of 1,500 to 2,000 feet other main headings called, in some instances, panel headings, in a group of four to eight parallels. From these main panel headings are driven room headings in a group of two to four parallels, from these room headings are driven the rooms.

Of the types outlined, I am most familiar with those employing multiple mains and panel headings with double and multiple room headings and most of what I wish to say concerns such an operation in which practically all invading openings are driven on a system of 60' centers.

In the early history of this mine, all rooms were driven as the corresponding room headings advanced—narrow at the room neck and widening out to 25 ft. The seam section of this mine averages 4 ft. with an average inclination of 3 percent.

Due to the lack of funds to prepare adequate pumping facilities in the mine to take care of the anticipated increase of water upon breaking of the strata through withdrawal of pillars, this operation was deferred for several years until such facilities were provided.

By the time pillar extraction could be undertaken, over a thousand rooms had been driven with pillars standing. Production had been kept up by double shifting all headings and a uniform advance was maintained in all sections of this mine.

When the pillars could be attacked the work was started in only one room heading at the inbye room pillars. A line of pillar retreat at an angle of 45° with the room center lines was decided

upon and maintained. In nine months this retreat line was 2,200' long, crossed four room headings and was producing considerably over 100 tons per day per room heading. With the success of pillar action assured, other sections were started in precisely the same manner.

Room headings with pillars standing in 25 rooms were worked out in a year's time. The rapidity with which the pillars were withdrawn, in the opinion of the management, resulted in a very high percentage of machine coal with its corresponding favorable differential over pick coal, entire freedom from heaving and a minimum of squeezed pillars.

Development had been rapid and as a result there were large areas in which first mining had been completed.

The established system then was to drive the rooms up the pitch as is the usual practice, and withdraw the pillars, later on down the pitch. While the methods used affected a high degree of concentration, it was discovered that considerable trouble could be experienced at certain points, if retreat was not kept in careful alignment, especially under the heavier cover.

To digress for a moment. The immediate roof over seam varied from a hard sand shale to hard sand stone. It was early observed that the roof was cut up into parallel sections by cleats, cleavage or joint planes. Experience with numerous falls and particularly falls in pillar sections revealed that this cleavage was visible as high as it was possible to see. Later, a shaft was sunk on this property and showed this cleavage persisting to the surface.

It was determined by the management to take advantage of any possibility of relief of pressure on pillars that this cleavage might afford by changing the direction of the line of retreat in pillar work to parallel cleavage.

Experience along this line developed slowly, but very little of it developed the fact that relief could be secured by changing the retreat line to parallel cleavage.

In order to maintain such retreat line

of former length, it was necessary to withdraw pillars up hill and this was gradually accomplished.

At this juncture, with the major portion of mining operations confined to the raise, the happy combination was arrived at of driving rooms up hill as first mining operations advanced and then follow this up with a retreating pillar line up hill. The operations thus being confined roughly to a small V-shaped area.

From this step, it was a short simple step to drive openings down hill, starting at inbye end of room headings in time to retreat with the pillar in its proper order, parallel to the cleavage. Later in the dip sections of this mine, continuity of operation was easier to maintain. Now all this is set forth to show how an important problem confronting a mine management of a large property was attacked in a certain manner, changed as new facts were uncovered until a rather successful plan, differing in many essentials from the original was evolved.

The pillar sections of this mine are unusually free from squeezed pillars, heaved road ways, uncovered pillars, lost material and many of the attendant ills that often are an accompaniment of pillar extraction.

The actual time involved in driving a room heading, on which are located 25 rooms and the extraction of these pillars is seldom now more than three to three and one-half years.

The output of this mine is still loaded by hand, cut largely by arc wall machines and loaded into mine cars handled at the face by room hoists. Bottom is shot in headings room neck and shoeflies only.

A second large operation in this field has the same seam and other natural conditions. Mains, panel and room headings were planned and driven in a manner very similar to the first operation cited. Pillars, however, have been drawn in each room heading independent of any contiguous areas and with only a short retreat line resulting in a much higher percentage of pick coal, lifting of second bottom, slower retreat, less concentration of effort. This has not been entirely due to lack of realization of advantages that might be derived from change, but is due mostly to a vastly increased demand for larger production, forcing the management to take advantage of all development made.

However, plans are slowly maturing to develop a continuous pillar line of retreat parallel to this regional cleavage. The second operation uses gathering locomotives and a large percentage of high wooden cars. Bottom is taken in all places, as a result a gradual change to low type of cars is also being made.

It might be of interest to note that the first operation has a daily average of approximately four and one-half net tons per employe at present. It also might be well to mention a scheme developed at this first operation discussed.

This particular scheme promises to become a storm center of discussion between the operators and the united mine

workers. The scheme is known locally as the "stagger" system and works out as follows:

First, the tippie and shaft bottom crews begin work at 6 a.m.; second a crew of motormen inside begin moving man trips at 6.30 a.m. The first man trip goes to a certain section of the mine in time for loaders to be at work at 7 a.m. At 7.30 a.m. a second set of motormen go to work and a second set of loaders to a different section. At 8.30 a.m. a third set of motormen and loaders start to work. If occasion demands, a fourth set will start at 9.30 a.m., etc.

On the second shift, the tippie and shaft crews start at 1.30 p.m. and a crew of second shift motormen begin shortly afterward with loaders, for say—the first section invaded in the morning. This crew is succeeded by other crews, much in the same manner as previously outlined. The object of the scheme is to eliminate the waiting time of the loaders, who, if the usual practice was followed, would enter the mine, reach his place and wait, many times, two or more hours, for cars.

All of these facts are cited to show that if one were familiar with all the systems employed in Central Pennsylvania, it is quite a certainty that he could find individuals who would at least point to a problem or two, perhaps, rather pressing ones, and there is a possibility that many such problems, unsolved in some localities, have been worked out to a satisfactory conclusion in others.

My suggestion is that the operating committees of the American Mining Congress study the following matters: How extensive in our own and other fields is the cleavage in the overburden? If cleavage is present, can a better measure of roof control be secured by observing certain directions in retreating pillar lines with respect to this cleavage in the overburden? How can we secure the best concentration and continuity of effort in first and second mining? What are the possibilities of increasing the loaders' pay through concentration of working areas? It is my belief that where cleavage is absent, it is due to a process of recementation, particularly in the same stone formations.

To many who have been connected with mining for many years, the problem of increasing the contract miners' daily wages is a vitally important one. It means the proper concentrated effort of all the forces and facilities used in connection with each individual mine and a casual inspection of the weigh sheets of many of our mining operations reveal a sorry state of affairs. Many of our mining disputes arise, and will rise in the future, from the fact that many miners present at their working place every working day fail to earn a proper wage because of the poor and inefficient service rendered him.

Illinois Coal Mining Industry in 1935

(Continued from page 28)

threes of endeavoring to establish official price schedules under the Coal Conservation Act, with the sky overcast with the clouds of numerous lawsuits and injunctions against this Act. Regardless of the decision that may eventually be made by the Supreme Court on the constitutionality of the act, the coal industry must have some form of price control. In the words of Dr. Glenn Frank, President of the University of Wisconsin,

"Some measure of social control of private enterprise has long since become imperative. We have reached a point in our economic evolution at which some force above the battle of miscellaneous private interests—whether it be the force of organized industry itself or the power of the state—must make for the general adoption of policies respecting wages, hours, prices, and profits that will bring our capacity to purchase into such relation to our capacity to produce as will keep our agricultural and industrial systems going concerns ministering effectively to the needs of the millions. The nature of such control is debatable, highly debatable. Its necessity, in my judgment, is not."

Consideration of our prospects for 1936 must be based fundamentally upon such price control—without it, there is little doubt that the law of the jungle would have full sway and bring heavy mortality among the coal-producing companies, and possibly throw this country into a disastrous industrial and economic upheaval. God forbid that such a condition should ever come to pass!

Given proper price control and equitable correlation of prices between competing districts and fields, the Illinois coal industry may look with some degree of hope for at least a partial restoration of its former tonnage, aided by the trend toward more efficient utilization and the expanding use in automatic equipment of our Mid-Western coals. No trick formula nor magic wand is available—over and above any situation that may be created, there will still remain the urgent need for our best brains, constant vigilance, and the old-fashioned gospel of hard work.

● THE HAYNES STELLITE CO. announces the publication of a new 8-page booklet, "Haynes Stellited Valves." Increased life and economy resulting from the application of Haynes Stellite to the seating surfaces of valves for use in high temperature, high pressure steam service are fully described. Freedom from wire-drawing, galling or seizing, and corrosion is insured by hard-facing steam valves with this cobalt-chromium-tungsten alloy. Copies of this descriptive illustrated booklet may be obtained from the Haynes Stellite Company, Kokomo, Ind.

SAFETY in the MINING INDUSTRY IN 1935*

THE past year has seen a rather remarkable awakening of the people of the United States to the fact that protection of life and limb in this country is given relatively little attention; as a result of the rather belated realization of the havoc annually wrought in the United States by automobile and other accidents (including those in industry and in the home), it is now realized that the financial losses due to these accidents are enormous even if all considerations of a humanitarian type are excluded. This awakening of safety consciousness on a nation-wide scale unquestionably has, and also in the future will have, an influence on the mining industry, notwithstanding the fact that mining has been engaged in accident-prevention work for years and has been making safety progress slowly but nevertheless surely. Oddly enough, notwithstanding the fact that statisticians place mining at the foot of the list of the major industries of the United States in the accident severity rate, the accident-prevention methods and practices for many years used by the progressive parts of the mining industry are now being adopted rather widely in the new nationwide crusade against accident occurrence.

In 1935 safety in the mining and allied industries continued to maintain the improved standard set during the years 1931, 1932, 1933 and 1934. While definite figures on accident occurrence for 1935 are not at hand, it is probable that there was a slight recession in safety achievement in coal mining compared with 1933 and 1934, and probably an even greater slipping in metal and non-metallic mineral mining in 1935 than in the record-breaking mine safety years of 1932, 1933 and 1934. Nevertheless, these recessions were relatively slight, and the mineral-producing industry of the United States seems to have had one of its best years from the viewpoint of prevention of accidents.

In coal mining it now appears that fatalities for the year will probably total around or slightly over 1,200 and that the fatality rate per million tons of coal produced will be less than 3.00; the rate for 1932 was 3.36, with 1,207 fatalities; for 1933 it was 2.78 (an all-time low), with 1,064 fatalities; and in 1934 2.93, with about 1,222 fatalities.

Nineteen hundred thirty-five had but four major disasters (a major disaster being an accident with five or more

By D. HARRINGTON†

deaths) with a total of 35 fatalities: An explosion in an anthracite shaft caused 13 deaths, a shaft accident at an anthracite mine killed seven, a fire at a bituminous mine caused six fatalities, and an explosion at a bituminous mine caused nine deaths. In 1934 there were two major coal mine disasters with 22 deaths (a fire killing five and an explosion 17), and in 1933 there was one (an explosion) with seven deaths. The only years previous to 1933 that coal mining had fewer than 100 deaths per year from major disasters were 1931 (56 deaths), 1921 (34 deaths), 1920 (61 deaths), and 1918 (54 deaths).

The average number of fatalities annually from major coal-mine disasters for the 25-year period, 1911-1935 inclusive, was 211; for the past three years it was 21, indicating that insofar as major coal-mine disasters are concerned, fatalities from them in the past three years have been reduced 90 percent. For the three years before the United States Bureau of Mines was established (1907-1909 inclusive), the average number of fatalities from major coal-mine disasters was 588 per year; when this figure is placed against the 21 persons killed per year by major coal-mine disasters in the past three years (1933-1935 inclusive) the progress showing is decidedly impressive, indicating a reduction of more than

96 percent in the number of coal-mine workers killed in coal-mine disasters now compared with 25 to 30 years ago.

In metal mining, while numerous instances are at hand of most excellent safety performance by individual mines or individual mining companies operating several mines, the probabilities are that with the greater activity of 1935 in the operation of small mines and prospects (especially in the search for gold with its enhanced price) the accident rate for metal mining as a whole will be increased. Small mines or prospects are prone to pay only limited attention (if they pay any) to health or safety. Usually these small properties are run without inspection by state authorities, sometimes because the state law exempts from inspection properties with relatively few men, but generally because the state inspection forces are entirely inadequate in personnel or in working funds (or both) to give these small properties the state supervision they should have. Very often the state inspection forces do not know of the existence of some of these small mines until in some manner they learn of an accident (*usually a fatality*) which occurs.

Metal mining has for several years been relatively free of major disasters (fires, cave-ins, floods, etc.) resulting in five or more deaths. Nineteen hundred



A well timbered and graded haulage. Note heavy rail used and rock dust

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† Chief, Health and Safety Branch, U. S. Bureau of Mines, Washington, D. C.

thirty-five was free of these catastrophes, though during the year six men were killed in a fire at a bunkhouse on the surface in a metal-mining camp in Colorado; this accident is not chargeable against the mine-accident rate, yet the mining industry is at least indirectly responsible. During the past 10 years there have been but 3 metal-mine fire disasters totaling 18 fatalities, a much more favorable record than during the previous decade.

Miscellaneous mining (other than coal and metal mines), such as cement plants, quarries, etc., appears to have also suffered to some extent in safety results during 1935, but any ground which may have been actually lost in accident prevention (and the losses if any will be relatively slight) is more than balanced by the eagerness, one might say, the determination and grimness with which accident-prevention programs and accident-prevention work are being forwarded with much renewed vigor, presaging safety returns for the relatively near future which it is confidently expected will far outshine those of a few years ago before the present slight let-down began.

In the past, tunnel work for municipal, state, railway and similar purposes has been conducted chiefly with the idea of obtaining high speed and low cost in construction and incidentally with little regard to health, life or limb, and with decidedly high rate of accident occurrence. In 1935 one of the most gigantic tunneling enterprises in the history of the United States was prosecuted with maximum vigor as to speed and economy but with due regard to health and safety, and it was definitely proved that sane attention to health and safety aided rather than retarded speed and low cost.

Nineteen hundred thirty-five witnessed several advances in mine safety prac-

tices, equipment, etc., which will unquestionably be reflected in bringing about lessened accident occurrence in the future. Approximately 7,000 of the workers of the United States in copper, lead, zinc, iron, gold, potash, mercury and silver mines, now use up-to-date electric cap lamps, with the possibility that the number will be much increased (probably at least doubled) by the end of 1936. Between 15,000 and 20,000 of these lamps are now used by metal miners in the United States, Canada, and Mexico. Numerous mining companies are interested in investigations into vision and lighting, and are making improvements upon getting pertinent data; one coal-mining company found that in the air of working places impregnated with finely divided coal dust from cutting, blasting, shoveling, etc., visibility as well as vision is decidedly reduced, with material increase in the



Safety Cans—The cans are tapered at the bottom to prevent bumping and the designers claim the good points of this can to be that a man cannot fall out if the can bumps.



Fire door. These doors are painted red and have instructions of what to do in case of fire printed on them in both English and Spanish

accident hazards as well as decreased ability to load clean coal. Inquiries as to gases due to blasting are becoming more frequent and insistent; and unquestionably investigations in this line will be made with the probability of at least better practice in the use of explosives in coal as well as metal mining, possibly along the line of restricting blasting to the end of the shift or to the off shift. Increased attention is being directed toward air conditioning in and around mines, in the use of mine timber preservatives, and in the use of protective apparel, such as hard hats, safety shoes, goggles, and other equipment; and safety educational activities of various kinds received considerable impetus in the past year.

Varied inquiries about health in and around mines have come to the front very definitely in the past year, including re-

quests for information as to the most nearly up-to-date types of mine change or wash houses; as to the effect of breathing gases or dusts (or both); as to methods of detecting the dust- or gas-inhalation hazard and of preventing such hazards to exist in and around mines, etc. The placing on the statute books of some states (and the threatened placing in others) of rather drastic provisions as to health compensation has quickened the interest of mining people in health problems to a very considerable extent, and the outlook for numerous alterations in mining practice looking to improvement of health in and around mines and mining properties is good. The present danger is that, in what might be termed the "hysteria of the moment," laws or regulations with provisions or requirements of doubtful basic foundation or utility will be enacted with the usual rigidity and finality of actions taken in the heat of such a controversy as that now "raging" in connection with occupational disease legislation and with especial reference to dust disease.

The numerous trends indicating progress in the past year or two as well as in the immediate future, in connection with safety in the mining and allied industries, give ample warrant for the belief that many of those in control of the mining industry have been imbued with the attributes of safety consciousness.

Due to their influence and example statisticians within a relatively few years should be forced to remove from mining the stigma of having the worst accident rate of the major industries.

Illustrations from U. S. Bureau of Mines.



Refuge station for use of men in case of disaster

RECENT ADVANCES

in ZINC METALLURGY*

THERE is a proverb to the effect that many important things have small beginnings. For a number of years prior to 1928, the year the Sullivan Mining Company's Electrolytic Zinc Plant was placed in operation, a small group of metallurgists and chemists was employed in a research laboratory set apart from the regular operations amid the tailings of the Bunker Hill mills. In that location although there was adequate rail and wagon road connections for all necessary purposes, there were found the correct isolation and freedom from distraction for proper experimentation. The problems that the experimenters confronted were the development of a process which would enable successful exploitation of the so-called "complex" zinc-lead-silver ores of the Coeur d'Alene district, consisting of an intimate mixture of zinc, lead, and iron sulphides, for the most part fine grained and closely interlocked. The recent and concurrent developments of selective flotation had made possible the production of separate concentrates of lead and zinc from these ores. Their particular phase of the problem, therefore, was the adaptation of the electrolytic process to meet the particular and peculiar requirements of the zinc concentrate resulting from selective flotation of certain Coeur d'Alene complex zinc-lead ores.

The result of that research was the development of 99.99 plus percent zinc at a time when most metallurgists felt that zinc running 99.90 to 99.94 percent was amply pure for commercial purposes. The executives of the Bunker Hill Mining and Concentrating Company and of the Hecla Mining Company—these two companies jointly owning the Sullivan Mining Company—had the responsibility of expending the large sum needed for the preliminary research and the subsequent larger sum for the commercial plant construction. Had they realized that they were facing, almost immediately following the commencement of operation of the zinc plant, the drastic ordeal of the depression and the trials and tribulations of the past few years, it is unlikely that they would have considered such a large undertaking. Disregarding this phase of the matter, their faith in the experiment has been justified as is evidenced by the following facts.

One very important use of zinc which

† Superintendent, Sullivan Zinc Plant, Kellogg, Idaho.

* Presented to 14th Annual Meeting, Idaho Mining Association.

By WALLACE G. WOOLF†

has had its major development during the last decade is die casting. Today the output is perhaps one-eighth that of galvanizing, which, as you know, is the largest use for zinc in this country. In die casting, however, there exists a large field in which such big strides have been made in the past few years, and in which many possibilities still exist, there is much reason for thinking that substantial further progress can be made from now on. Die casting is the art of forcing molten metal under pressure into steel molds. In a single automatic operation raw material is converted into accurately dimensioned parts. These castings are clean-cut and require practically no machining. No other method of producing accurate and complicated metal parts is so ideal from a manufacturing standpoint.

The essential parts of most die casting machines consist of a melting pot to hold the molten metal and a submerged pump. Movement of the plunger in an outward direction causes the pump cylinder to be filled with metal; depression of the plunger into the cylinder then forces the metal into the die, where it solidifies almost at once. The die, being split, is then opened, whereupon air pressure forces the solidified casting from the die. The die is then closed and the operation is ready for the second cycle.

Only a short time ago commercial die casting was limited to the use of metals with low melting points—lead, tin, and babbitt. Castings made from such metals have but little strength. Difficulties increased when attempts were made to use metals with higher melting points. Progress has been made in the art and in recent years die casting has grown to be a major industry. The rapid development of the use of zinc alloy die casting into new fields is due to developments in alloys, machines, and technique, all of vital importance. It is, however, to the first of these—the zinc base die casting alloys—that I wish to direct your attention. The need for metals having low melting points but greater strength naturally suggested the use of zinc, and zinc alloys were used early in the art.

In most instances, ordinary Prime Western zinc was used in these alloys. This was most unfortunate. Aging changes in these alloys affecting dimensions and physical properties occurred, intensified when the casting was subjected to hot, humid atmosphere. The castings warped and cracked, and even fell to pieces merely upon standing for a comparatively brief interval of time. Zinc base alloys for die casting fell into the discard. Later work indicated that certain impurities in the zinc metal caused the instability of the zinc alloys, but, as in many such cases, this fact was but slowly accepted by those concerned.

About this time Sullivan Mining Company pioneered the development of 99.99 plus percent zinc. This provided zinc of requisite purity as a base for a die casting alloy which has the requisite properties and permanence in the finished part. Tests by commercial concerns and a very detailed, complete study under the auspices of the American Society for Testing Materials have proven conclusively the necessity for 99.99 plus percent zinc in the alloys. Today all zinc die casting alloys are based on 99.99 plus percent zinc and the American Society for Testing Materials has adopted a special high grade specification to cover this grade of metal. The resulting expansion of the zinc base die casting industry never could have resulted from die casting technique alone unless alloys had been available for the purpose.

Zinc die castings are produced today which are satisfactory for a vastly wide field of uses. As an outstanding example, there is now being used about forty zinc base die castings in the modern automobile. In the automobile industry it is said that mass production methods make zinc die casting unit cost economies so obvious that they cannot be overlooked. Gears and other mechanisms, vending machines, toys, lamps, household utensils—such as washing machine parts, mixing machines and the like, office machines, electric clocks, electric fans, refrigerator hardware, cameras, locks, razors, electrical and telephone equipment—even

golf club heads—are being made in zinc base die castings. Alloys having tensile strengths of about 44,000 lbs. per square inch, impact strengths of about 15 foot pounds charpy, are thus used. 99.99 plus percent zinc made this alloy possible. Bunker Hill is not the only 99.99 plus percent zinc that is produced today, but—it was the first.

Realizing the full effect of even small amounts of impurities in special high grade zinc, the Sullivan Mining Company has continued to improve the grade of Bunker Hill Brand zinc until now it analyzes 99.9975 plus percent zinc. The accomplishment of this high degree of purity in commercial production is our claim to fame. This is the purest metal, so far as I know, that is being produced today anywhere in the world on a commercial tonnage basis. This degree of purity is not merely academic; it has a real worth in the field for which super high grade zinc is used. "Pure as minted gold" is an age-old expression and even to this day is used in describing anything of exceptional purity. Now, the fact is that mints the world over consider 999 fine a high purity for refined gold. This means that all impurities together form but one part of a thousand, which is a standard of refinement resulting in the adage I have just mentioned. Bunker Hill zinc is shipped daily in carload lots under guarantee to be 99.9975 percent zinc. All impurities together form but 25 ten-thousandths of 1 percent, or one part in 40,000 parts. This zinc is 40 times "as pure as refined gold."

Dr. John Fairfield Thompson, Vice-president of the International Nickel Company, and the U. S. representative at the Seventh Industrial Congress of Mines, Metallurgy, and Applied Geology, held in Paris the week of October 17 last, in a paper before that Congress said:

"Once we approach this field (alloys), we find that there has been a development of tremendous significance. It is the mutual recognition by workers in metals on the one hand, and by designers and industrialists on the other hand, that an almost limitless variety of alloys can be 'custom built' to meet the specific requirements of given applications.

"To a marked degree the modern metal worker can compound an alloy to exact prescription, and consequently the designers and engineers are released to dare and to do things which were thought impossible less than ten years ago."

Much work is still being done on zinc base die casting alloys, and the indications are very favorable that alloys even more satisfactory than those now in extensive use will soon be at hand. The production commercially of very pure metal aids materially in the development of these alloys and in the stimulation of research so that more complete knowledge of the properties of metals and alloys will be available. One must have the proper tools before the job can be done.

Other uses for high grade zinc are



Surface Plant, Sunshine Mining Co.

also being developed. Galvanizing—the art of coating iron with a zinc layer—has long accounted for the greatest consumption of zinc. At the present time, for special purposes in which the galvanized article is to be subjected to extra severe bending stresses or where permanence and rust-resisting quality are most important, high grade zinc is being used in place of more impure grades. So-called "hot dip" galvanizing as well as electrolytic galvanizing of super high grade zinc is being done. Telephone wire and wire used for the construction of the new suspension bridges, which are being erected in such places as the San Francisco Bay and the Metropolitan district of New York, are thus galvanized.

It is no longer sufficient for the metal producer merely to turn out the metal; he must interest himself in the development of its uses by the fabricators. By this I do not mean necessarily engaging in the business of the metal fabricator, but aiding him by research and technical advice to the end that the producer may

keep his metal in the vanguard in the severe competition that exists and will always continue to exist among metals in the industrial world. Economy, strength, permanence, accuracy, uniformity, finishing properties—cause day by day shifts in the uses of different metals. We of the Sullivan Mining Company take pride in providing a very pure zinc for all possible uses wherein the metal can be used. And we intend to so conduct our enterprise in the future as to retain and merit the zinc industry's continued approval of our activities.

In the potato field, Idaho is supreme. The superiority of the Idaho potato has nation-wide recognition. In the zinc field, Idaho has a similar claim. Idaho zinc is unequalled in the nation or in the world. In the zinc industry this superiority is recognized. I should like this fact to become more generally recognized by the citizens of the State of Idaho as a whole, most certainly by those engaged in the mining and metallurgical field who should be most interested.

U. S. Bureau of Mines

(Continued from page 35)

and eventually to combine these publications in a printed volume comprising a mineral industries survey atlas of the state.

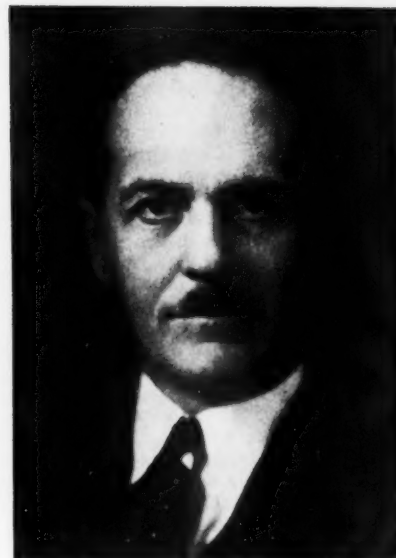
7. Geophysical Prospecting Section: Arrangements have recently been completed for cooperation with the Geological Survey in the application of geophysical methods to the study and solution of geological problems. During the past field season geophysical surveys have been conducted to aid in the location of subterranean water reservoirs in Nevada and Texas, and a geophysical laboratory is being equipped and staffed at Reno, Nev., for research work in the

application of geophysics to mineral prospecting. This section is also engaged in perfecting and testing various types of apparatus, including, besides the instruments used in ordinary prospecting, seismographs for the measurement of effects of blasting operations, mentioned above, and others for detecting supersonic vibrations suspected to exist when rock formations are under extreme stress. The current literature on geophysical prospecting in all languages is translated, abstracted, and published in a regular monthly issue of "Geophysical Abstracts." The section is frequently called upon by other Federal agencies and State officials for assistance in contouring bed-rock below the surface at proposed dam sites and in connection with water-supply surveys.



Howard I. Young
President

THIRTY-EIGHTH
ANNUAL MEETING
AMERICAN
MINING CONGRESS

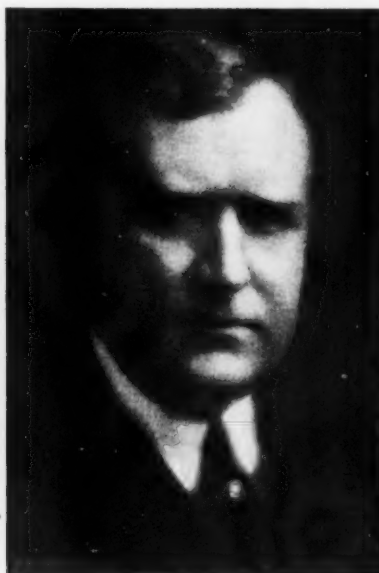


Julian D. Conover
Secretary

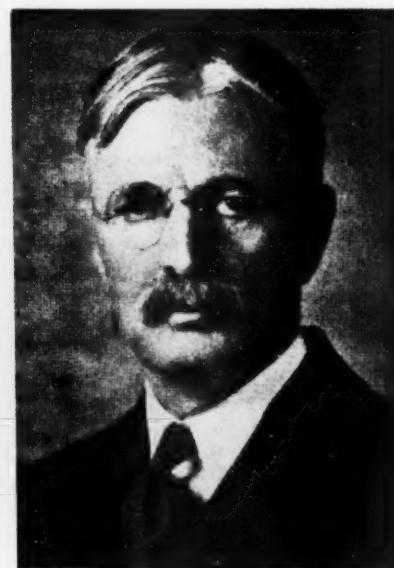
THE 38th Annual Meeting of The American Mining Congress was held at the Waldorf Astoria Hotel, New York City, January 14 and 15, 1936. It took the form of a strictly business session, for the submission of reports from the secretary and the standing committees, and for the election of officers for the ensuing year. A round-table conference on January 15 was attended by a large group of important mining men, representing all branches of the industry. They discussed the serious national problems confronting the industry, and endorsed the statement of principles which appears in this issue. All officers were reelected, and J. D. Francis, president, Island Creek Coal Company, was elected to the Board of Directors to fill a vacancy.



W. J. Jenkins
Re-elected Director



D. D. Moffat
Vice President



Clinton H. Crane
Re-elected Director

STATEMENT of PRINCIPLES

THE AMERICAN MINING CONGRESS, representing the mining industries of the United States, recognizing that our country is richly endowed with natural resources; that our civilization is characterized by expanding material wants and enormous potential consuming capacity; that this combination of natural resources and consuming capacity is the basis for an economy of plenty; and that intelligent combination of labor and management with capital under a system of private enterprise, which preserves the incentive to individual achievement and profit, offers the most practical means of creating the maximum volume of wealth in the form of goods and services available to the greatest number of people and of bringing about a proper distribution of such wealth, urges that the following principles and measures be made effective in the conduct of national affairs.

ECONOMIC STABILITY

Restore confidence.

The foundation of economic recovery is confidence.

Essential to confidence are balanced budgets, stable money, thoughtful, well considered legislation confined to sound general principles, impartial administration of the law, and encouragement of private enterprise and initiative.

BUREAUCRACY

Check bureaucracy, abandon government by men and return to government by law.

LABOR RELATIONS

Secure to employees freedom from coercion from all sources.

The essential interest of employe and employer is to obtain efficient production through the cooperative efforts of labor, management and capital. Avoid government interference with such cooperation.

Let employers and organizations of employees be subject alike to legal responsibility for their conduct and that of their agents.

RELIEF

Substitute direct relief at reasonable subsistence rates for work relief.

Discontinue Federal administration of relief at the earliest possible date and return it to local agencies.

RECIPROCAL TRADE AGREEMENTS

Make no changes in tariff rates through trade agreements with foreign countries without specific approval of such changes by Congress after public hearing.

FINANCES

Reduce government expenditures.

Balance the budget.

Re-establish congressional control over expenditures.

Use the taxing power solely to raise revenue for the necessary expense of government.

No manipulation of money or figures and no use of hidden or indirect taxes can change the fact that everybody pays taxes and that the people as a whole must produce and furnish to the government all that it spends. Continuation of the present rate of spending will inevitably bring about a broadening of the base for personal income and other direct taxation.

TAXATION

Deal fairly with the taxpayer in the enactment and administration of tax laws.

Remove from tax laws all provisions which repress and retard business enterprise, employment of workers and economic recovery.

Amend the federal tax laws to re-establish the flat rate of corporation tax, to restore the right to make consolidated returns, to remove the tax on dividends received by corporations, to permit business losses of one year to be deducted from future income, to provide full allowance of capital losses, and to permit annual declaration of value for capital stock taxes, particularly in case of mining properties in the development stage.



James F. Callbreath
Secretary Emeritus



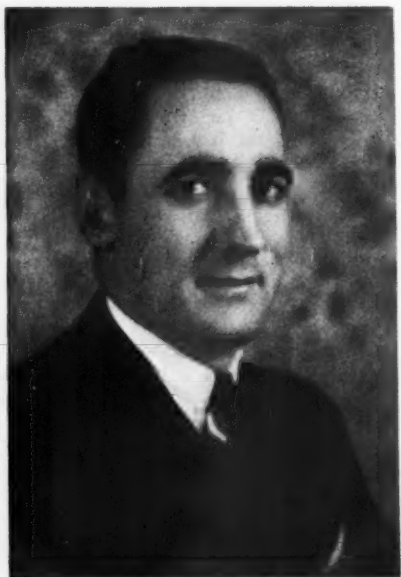
J. D. Francis
Newly Elected Director



D. A. Callahan
Vice President

COAL'S CONVENTION and EXPOSITION

Making Rapid Progress



R. E. Salvati

ON January 30, the final meeting of the program committee for the Annual Convention and Exposition of the Coal Division, of the American Mining Congress, completed its suggestions for papers to be presented to the meeting. The committee is under the direction of Mr. R. E. Salvati, vice president, Island Creek Coal Company, and an industry-wide committee of 78 members. District meetings of this group were held in Charleston, W. Va., Chicago, Illinois, and Pittsburgh, Pa. As a result of this cooperative effort the following topics have been selected: (1) New Things in Coal Cleaning, (2) New Things in Coal Treating; (3) High Production in Cutting Machine Efficiencies, (4) New Methods of Face Preparatory, (5) Coal Distillation, (6) Cutting Bit Treatment, (7) Methods of Cutting Out Slate Bands, (8) Progress of Mechanical Loading and Conveyor Mining, in all fields including mining conditions and factors affecting development (this to be a series of papers); (9) New Things in Mine Safety, a series of 5-minute discussions of entirely new things; (10) Comparison and Causes of Accidents Over 5-year Period, (11) Methods of Allaying Dust at the Face, (12) Employes Safety Meetings—Open and Closed, (13) Coal Bumps

Under Heavy Cover, (14) Hitch Drill Practice, (15) Effect of Width of Places on Top, (16) Mechanical Loading System, (17) Increasing Efficiencies in Transportation, (18) A Conveyor Mining System, (19) Thermit Welding for Mine Tracks, (20) Relation Between Life of Entry and Type of Track Equipment, (21) New Designs in Car Construction—a series of short papers, (22) Haulage Practice, (23) Trip Dispatching and Car Movement Records, (24) A Trackless Mine, (25) Mercury Arc Rectifier, (26) Air Conditioning, (27) Power Efficiencies, (28) Aero Mechanics as Applied to Mine Ventilation and Fans, (29) New Devices and Means of Reducing Electrical Maintenance of Equipment, (30) Mechanical Mining in the Roslyn Field, (31) Driving Rock Tunnels with Shaking Conveyors and Duckbills, (32) Prospecting for Coal with Diamond Drills, (33) New Central Coal Cleaning Plant of the Northwestern Improvement Company, (34) Rock Dusting, (35) Power Plant Operation, (36) Newest Developments in Strip Mine Haulage.

These cover the major topics selected, but there will be many additions through discussions, and short papers.

Assisting Mr. Salvati, as state or district chairmen, are: C. E. Cowan, vice president, Monroe Coal Mining Co.; W. F. Hazen, general superintendent, Wheeling Township Coal Mining Co.; T. J. Thomas, president, Valier Coal Co.; Wesley S. Harris, president, Bicknell Coal Co.; Henry F. Warden, general manager, American Coal Co. of Allegany County; R. E. Galbreath, Wisconsin Steel Co.; A. H. Reeder, general superintendent, Stonega Coke and Coal Co.; L. Russell Kelce, vice president, Hume-Sinclair Coal Mining Co.; D. R. Swem, manager of Coal Operations, Northwestern Improvement Co.

S. W. Blakeslee, Philadelphia & Reading Coal & Iron Company, has accepted the chairmanship of the committee on arrangements. He will be responsible for the special committees which will arrange for a smooth running and efficient convention. He will be assisted by A. B. Agee, Youngstown Mines Corporation, as chairman of the committee on "welcome," and by John T. Ryan, Mines Safety Appliances Company, who will represent the manufacturers on this committee. W. P. Vance, Butler Consolidated Coal Company, and Geo. R. Delamater, W. S. Tyler Company, have accepted the responsibility for the committee on "attendance"; W. W. Dartnell,

Valley Camp Coal Company, and Theodore Martin, *The Explosives Engineer*, will serve on the "floor, of steering" committee; W. D. Turnbull, Westinghouse Electric & Mfg. Company, who has so ably handled "Our Gang" in the past, will serve as chairman of the entire entertainment committee, and will be assisted by J. R. Ulrich, Bethlehem Steel Company; L. Russell Kelce, Hume Sinclair Coal Company; C. P. Daniels, Enterprise Wheel & Car Corp.; H. H. Taylor, Jr., Franklin County Coal Co.; R. J. Ireland, Owl Creek Coal Co.; H. C. Stelling, Union Carbide and Carbon Corp.; and H. B. Husband, Chesapeake & Ohio Railway Fuel Mines. E. C. Reither, Timken Roller Bearing Company, will serve as chairman of the prize contest committee. Other chairmen will be appointed shortly by Mr. Salvati. A. R. Joyce, Wood Preserving Corporation, will act as toastmaster at the annual dinner.

Everything is underway for the greatest convention in the history of this group.

The exposition is of more than usual importance, and has been busy establishing its own record, which it has done with efficiency and dispatch. At this writing, Feb. 12, 1936, approximately four months before the convention and exposition open, the "standing room only sign" is displayed. On the first call for applications for space, all space available in both the north and south wings of Music Hall, where the exposition is always staged, was taken. At a special meeting of the Board of Governors of the Manufacturers Division, on January 31, a resolution authorized the opening of the second floor at Music Hall. The space available on this floor will enable the committee to take care of about thirty additional exhibitors. Those who have already taken space are as follows:

U. S. Steel Corp.
American Car & Foundry Co.
McNally-Pittsburgh Mfg. Co.
Socony-Vacuum Oil Co.
Allen-Sherman-Hoff Co.
Williamsport Wire Rope Co.
Allis-Chalmers Mfg. Co.
Sanford-Day Iron Works, Inc.
Norma-Hoffmann Bearing Co.
LaBour Co., Inc.

Lehigh Safety Shoe Co.
 Templeton Kenly Co.
 Universal Lubricating Co.
 Irwin Foundry & Mine Car Co.
 Stephens-Adamson Mfg. Co.
 Pennsylvania Electric Repair Co.
 Duquesne Slag Products Co.
 West Virginia Rail Co.
 Jeffrey Mfg. Co.
 Tool Steel Gear & Pinion Co.
 Phillips Mine & Mill Supply Co.
 Keystone Lubricating Co.
 Hendrick Mfg. Co.
 Tyson Roller Bearing Co.
 Link-Belt Company
 Frank Prox Co.
 Cincinnati Mine Machinery Co.
 Joyce Cridland Co.
 Bethlehem Steel Company
 Broderick & Bascom Rope Co.
 New Departure Mfg. Co.
 National Malleable & Steel Castings
 Company.
 Grasselli Chemical Co.
 Fafnir Bearing
 Bertrand P. Tracy Co.
 Koppers Rheolaveur Co.
 Marion Steam Shovel Co.
 Princeton Foundry & Supply Co.
 Hockensmith Wheel & Mine Car Co.
 Duff Norton Mfg. Co.
 Jeffrey Mfg. Co.
 National Carbon Co.
 Myers-Whaley Co.
 Portable Lamp & Equipment Co.
 Standard Oil Co.
 General Explosives Division of the
 American Cyanamid Corp.
 National Electric Coil Co.
 Columbia Alkali Co.
 Gulf Refining Co.
 Robins Conveying Belt Co.
 Nordberg Mfg. Co.
 Utility Mine Equipment Co.

(Concluded on page 58)

DISTRICT CHAIRMEN



W. F. Hazen



Henry F. Warden



D. R. Swem



R. L. Kelce



Wesley S. Harris



T. J. Thomas



R. E. Galbreath

Of All Things . . .

Al Smith called it a rubber-stamp Congress. . . . But it isn't. . . . It repeals Administration bills just as quickly as it passes them. . . . The Cotton, Tobacco, and Potato Acts were killed in a couple of hours. . . . Of course, 24 hours before the President had suggested they be repealed. . . .



There's only one hard-rock miner in the Senate. . . . James E. Murray, of Montana, carried "a bucket" in the Butte copper mines 25 years ago. . . . The engineer who lowered him on his first shift campaigned for him. . . .



The gilded ornate ceiling in the new Supreme Court chamber has been covered by white cheesecloth to improve the lighting and the acoustics. . . . Just the same the country hasn't had any trouble hearing the justices lately. . . .



It develops that Administration doesn't have to rely on its braintrusters in a pinch. . . . A couple of ordinary newspaper reporters are responsible for the new farm legislation. . . . They reminded the AAA administrator that the Soil Conservation Act of last year allowed him to do "anything." . . . The Administrator sent for a copy of the Act, took one look, and in 10 minutes the entire Agricultural Department was in a turmoil. . . . Two days later legislators admitted they were beginning work on a new bill, based on the Soil Conservation Act. . . .



There was fire and smoke in the Senate Foreign Relations Committee over the Administration's neutrality bill. . . . Exclaimed one opponent of giving the President discretionary power to cut off exports of commodities: "Freedom of the seas is not going to be decided. We are merely going to reserve it for the warring nations." . . .



The new Senator Long doesn't anticipate as heavy a correspondence as her husband. . . . The former Senator had a suite of five rooms in the Senate Office Building and his filing cases were bulging then. . . . Mrs. Long moved into a three-room suite formerly occupied by the late Senator Schall of Minnesota, also an Administration critic. . . . The new Farmer-Laborite, Senator Benson of Minnesota, was assigned the old Long offices. . . .

The Townsendites have been catching it in the House lately. . . . Their proponents claim that the one and one-half billion dollar monthly cost of the plan would go direct to labor and industry. . . . And their opponents want to know if it isn't from labor and industry that the money would come in the first place. . . .



Beneficent old Uncle Sam. . . . He advanced the cotton growers 12 cents a pound for cotton. . . . Now it develops that the Commodity Credit Corporation is going to take a \$40,000,000 loss on its cotton holdings. . . .



During the war it was the doughboy who bled for his country. . . . But whether Democrat or Republican administration, after 1937 it's going to be a chap known as John Public Taxpayer who will do the bleeding. . . .



Many Senators ride around Washington in their own privately chauffeured cars . . . some in taxicabs. . . . The street cars are good enough for Senator Gibson, of Vermont, who maintains his New England touch with the common people in the whirly-gig of Washington. . . .



Harry Hopkins tells six Senators privately that unemployment is only slightly improved over what it was a year ago. . . . He tells the press that the relief program is better this winter than ever before. . . . What a lot of people want to know is better for whom. . . .



And still they say the Government can't get things done! . . . Why that Florida ship canal was first planned in Andrew Jackson's regime and here they are shoveling dirt already. . . .



The bonus proved one thing. . . . We're still paying pensions for the War of 1812. . . . Which means that we have one war completely paid for . . . the Revolution of 1776. . . .



News and Views

of Interest to Mining Men

● THE American Iron and Steel Institute on January 7 reported the production of open hearth and Bessemer steel ingots in 1935 at 33,425,586 gross tons. This shows an average operation of 48.55 percent of capacity.

● THE MONTANA CONSOLIDATED Mines Corporation plan to start on February 1 a new 3,500-foot tunnel to open up their Kleinschmidt-Irish Syndicate silver-lead-gold property near Winston, Mont., at a depth of 500 feet below the old workings. The Spring Hill gold operation of this company, near Helena, Mont., is running at the rate of 300 tons per day, with a total gold production of 7,920.8 ounces during the nine and one-half months of operation during 1935.

● A SECRET monetary agreement between the United States and Mexico was concluded in Washington on January 6 by Secretary Morgenthau and Eduardo Suarez, Mexican Finance Minister. The *Wall Street Journal* reports that the agreement follows an attempt by Mexico to rid itself of its silver reserve, obtaining gold in exchange and thus strengthening its currency. To prevent this step, which would have left the United States more isolated on the silver question, it is agreed that the Secretary will take over a part of the Mexican silver in return for gold and for a promise that Mexico will not dump the rest of its silver on the world market.

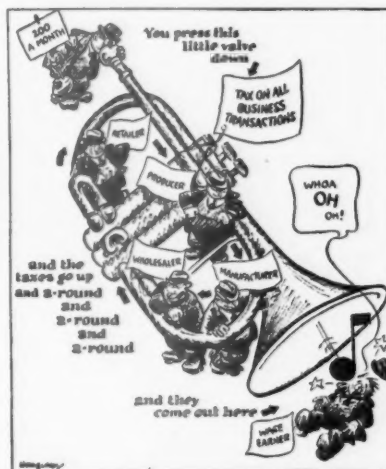
● GUY T. HELVERING, Commissioner of Internal Revenue, reports collections of \$3,299,000,000 during the fiscal year which closed June 30. This total was the highest reached by Federal tax collections since the 1921 fiscal year and is the result of a steady gain in taxes. President Roosevelt estimated that internal revenue collections will climb to more than five billion during the 1937 fiscal year.

● THE eighth annual convention of the Institute of Scrap Iron and Steel was held in Chicago January 21 to 23, inclusive.

● UNDER the trade agreement with Canada, which became effective on January 1, 1936, the duty on equipment classified under Canadian Tariff Item 427—Machinery of Iron or Steel, n.o.p.—was reduced from 35 percent to 25 percent, and a new item was established—Ex. 427: Machinery of Iron or Steel, n.o.p., of a class or kind not made in Canada—on which the duty is 20 percent.

These two tariff classes apply to a large percentage of machinery sold by the United States to Canadian buyers. In the administration of the new tariff rates, the Department of National Revenue has ruled that machinery which may be claimed to be "of a class or kind not made in Canada" will pay the 25 percent rate, pending a ruling by that Department as to whether the particular shipment under consideration is in fact "of a class or kind not made in Canada." If the ruling is favorable, a refund will be made to the importer. This ruling is contained in instructions issued by the Department of National Revenue to customs collectors, a copy of which is appended to this circular. The action taken by the Canadian Gov-

TOWNSEND PLAN'S AIM IS SPLENDID, BUT—IT WOULD GO LIKE THIS



—Centralia, Ill., *Evening Sentinel*.

ernment simply means that although a Canadian tariff item provides for a lower rate of duty on imports of machinery of a class or kind not made in Canada, a higher rate will be applied at the time of importation, pending a ruling on the "made in Canada" question. In this connection, the ruling made on this question under the Canada-Japanese Trade Agreement, machinery produced in Canada to the amount of 10 percent of normal Canadian consumption is construed as "of a class or kind made in Canada."

● THE TENNESSEE COAL IRON & R. R. COMPANY, subsidiary of the United States Steel Corporation, is reported planning the purchase of the

plants of the Virginia Bridge & Iron Company. It is said that this acquisition will give the Corporation fabricating facilities in a territory where previously it has not been a dominant factor.

● THE Wheeling Township Coal Mining Company, the Republic Steel Corporation, the Buckeye Coal Company, and the Youngstown Mines Corporation have applied for an injunction restraining the Government from collecting the Guffey tax.

● THE DEPARTMENT of Labor of the State of Pennsylvania has issued, in mimeographed form, the annual report of the secretary, who states in her introductory sentence that her first annual report two years ago "listed desirable objectives which the department should strive to attain in the interest of the nation's wage earners, thus fulfilling its duties under the law quoted. Among these objectives toward the accomplishment of which the department has devoted its energies and resources were:

"1. Unemployment compensation. This has been accomplished in the Social Security Act.

"2. Old-age security. This has been accomplished in the Social Security Act.

"3. Boards for hearing locally and investigating and making findings on complaints of industrial practices and in cases of industrial disputes. This has been accomplished by the setting up of the National Labor Relations Board and its regional boards, through the designation of special boards in steel, textile, coal, and in the maritime and lumber industries, and in the designation by the Secretary of Labor of boards to handle local disputes in different sections of the country.

"4. Greater cooperation between the State and Federal Labor Departments. This has been greatly forwarded through regular national and regional conferences aimed to raise standards of labor legislation to a desirable common level so as to benefit the individual wage earner, employer, and investor, and ultimately to evolve a sound and unusual labor law policy throughout the country by the historical method of state and Federal co-operation.

"5. Development of the United States Employment Service in cooperation with the states. This has been largely accomplished with 40 states accepting the provisions of the Wagner-Peyser Act, which created the service, and with 27 of them organizing employment services affiliated with the United States Employment Service."

● THE Department of the Interior announces, through an advance statement prepared by Philip S. Smith, of the Alaskan branch of the Geological Survey, that the minerals produced from Alaska mines in 1935 had an estimated value of \$18,859,000, as compared with \$16,721,000 in 1934. This brings the value of the mineral output of Alaska since 1880 to practically \$700,000,000.

The figures for 1935 are preliminary estimates and are especially subject to revision because advance information before the end of the year has been less complete than usual. The final figures will appear in the Geological Survey's annual report on the mineral resources of Alaska, now in preparation.

● **THE ANTHRACITE** operators have selected Maj. William W. Inglis, president of the Glen Alden Coal Company, as the Chairman of the producers' Negotiating Committee, which is to meet with the representatives of the United Mine Workers of America in the effort to work out a new wage agreement, effective April 1, 1936, on the termination of the present contract. Major Inglis, who is Chairman of the Anthracite Board of Conciliation, was the unanimous choice of the members of the operators' Negotiating Committee at a meeting held in New York on January 7.

The other members of the committee are Mr. Ralph E. Taggart, president of the Philadelphia & Reading Coal & Iron Co.; Mr. James Prendergast, president of the Susquehanna Collieries Co.; Mr. J. B. Warriner, president of the Lehigh Navigation Coal Co.; Mr. Michael Gallagher, president of the Pittston Co.; Mr. A. B. Jessup, vice president and general manager of the Jeddo-Highland Coal Co.; and Mr. James H. Pierce, president of the East Bear Ridge Colliery Co., these gentlemen having been selected as members of the Negotiating Committee at a meeting of the anthracite operators held in New York on December 12.—*Anthracite Bureau of Information.*

● **THE HOMESTAKE MINE**, at Lead, Lawrence County, the largest producer of gold in the United States, yielded more gold in 1935 than in any other year of its history of 60 years of almost continuous operation. Dividends paid during the year were \$14,064,960, bringing the dividends paid to date to \$88,020,442. The total yield from bullion and concentrates from 1876 to 1934, inclusive, has been \$282,810,490, after freight, express, insurance, mint and smelter charges are deducted. An additional new steam electric power plant with a capacity of 16,100 kva for the mine was nearly completed at Kirk, 1½ miles from Lead. The new 5,000-ft., 3-compartment, 13-ft. by 19-ft. Ross shaft, ultimately to reach a depth of 5,000 ft., was operated down to the 3,500-ft. level. Reports of the Homestake operations published in the press by the state treasurer of South Dakota in relation to state tax of 4 percent on gold output show 354,560 tons of ore treated in July, August, and September, valued at \$4,754,103.15, or \$13.41 per ton.

● **AT THE 157 lignite mines** in operation in North Dakota during 1934 there were 1,518 men employed 1,967,748 man-hours in the production of 1,753,888 tons. The 1933 production from 138 mines totaled 1,782,272 tons, with 1,301 employees working 1,868,604 man-hours.

+ + + DAILY TAX FACT

By B. C. FORBES

Noted Financial Writer

Politicians slyly try to make working folks believe that only the rich pay taxes.

More cigarettes are smoked by the poor than by the wealthy.

Do you know that every time you pay a quarter for two packages of cigarettes, you pay 12 cents in taxes to the federal government?

Washington actually gets more than the manufacturer who produces the cigarettes.

Were there no taxes, cigarettes would cost you only about half as much.

One tobacco company alone, not the country's largest, paid the federal government \$142,241,267 in taxes during the last eight and one-half years. This was six and one-half times the total wage bill for the same period.

In 1900 the government collected from cigarette taxes only \$3,969,191. During the year ended June 30, 1934, the tax toll was \$350,299,442—an increase of 8,725 per cent.

Only the rich pay taxes?

Poppycock!

(Copyright, 1936, by B. C. Forbes)

+ + +

Accidents in and about the mines during 1934 resulted in 5 fatalities and 145 non-fatal injuries, with per-million-ton fatality and injury rates of 2.851 and 82.673, respectively. There were 6 fatalities and 144 injuries in 1933, and the fatality and injury rate per million tons were, respectively, 3.366 and 80.796. The above data are taken from a report, published by the U. S. Bureau of Mines, which also gives man-hour data. Single copies (No. 1389) giving statistics by counties will be furnished upon request.

● **THE BILHARZ MINING CO.**, who recently purchased the Barnsdall mill, northwest of Baxter Springs, Kans., and converted it into a tailing mill, has started operating.

The mill is one of the most complete plants in the field and some improvements were added since the property was acquired by O. W. Bilharz and associates. The plant contains two rougher jigs, a cleaner jig, a sand jig, six tables, five float machines, a filter and a Dorr thickener.

Tailings at the Barnsdall and the old Brewster tailings of the Chanute Spelter Company will be treated over the plant.

● **AT A MEETING** of the Board of Directors of the Virginia Coal Operators Association, held at Norton, Va., on Monday, January 20, 1936, Mr. George H. Esser was elected secretary of the association, effective February 1, 1936, vice Mr. C. B. Neel, deceased. At this same meeting Mr. E. H. Robinson was re-elected assistant secretary.

● **PUBLIC HEARING** on the proposed marketing rules and regulations sub-

mitted by representatives of the District Boards in Price Area No. 1 was held by the National Bituminous Coal Commission at the Carlton Hotel, Washington, D. C., January 20, 1936. Representatives of the producing, distributing, and consuming branches of the bituminous coal industry appeared before the Commission and presented their views. Much discussion took place relative to the proposed section covering definitions of "general sales agent," "sales agents," types of "wholesalers," and "discounts."

The proposed draft of regulations is divided into the following 12 sections: (1) Definitions; (2) Special Sales Agents and Sales Agents; (3) Wholesalers, Lake Forwarding Wholesalers, and Tidewater Forwarding Wholesalers; (4) Farmers' Cooperative Organizations; (5) Wholesale Discounts; (6) Registered Transshippers' Discounts; (7) Quotations and Options; (8) Spot Sales; (9) Contracts; (10) Terms of Payment; (11) Sales of Coal other than F.O.B. mines; and (12) Miscellaneous. The Commission also took under consideration a suggestion calling for establishment of rates of maximum wholesale discounts.

● **STEADY** progress toward the attainment of safer working conditions in the anthracite mining industry in Pennsylvania is noted in a statement made by Dr. J. W. Finch, Director of the Bureau of Mines.

In 1910, the year in which the Bureau of Mines was established, 601 anthracite mine workers were killed, whereas the number in 1933 was but 231. The accidental death rate per thousand 300-day workers in 1910 was 4.65; in 1933, 3.58. The number of men killed per million

tons of anthracite produced in 1910 was 7.11, while in 1933 it was but 4.66. There have, of course, been some fluctuations during this 24-year period, but there has been a general steady decline in accidents. In the four years from 1930 to 1933, the nonfatal injury rate per thousand 300-day employees decreased from 309.8 to 269.3. The injury rate per million tons of coal produced fell from 469.9 to 350.6. Data regarding nonfatal injuries are not available for the years preceding this period.

This significant decline in accident rates is largely due to the efforts of the mine operators, the officials of the United Mine Workers of America, the Pennsylvania State Mine Inspection Department, and the miners themselves cooperating with the United States Bureau of Mines.

In recent years, the Federal Bureau of Mines has trained 15,000 anthracite workers in first-aid and mine-rescue methods, although the Bureau has been greatly handicapped because of the lack of personnel to do this work.

The Bureau of Mines has recently analyzed hundreds of air samples from all important mines in the anthracite district and made special reports to the operators, thus providing accurate data as to possible hazards from gas explosions. From the time of starting this work in September, 1932, to July, 1933, not a single major explosion occurred in any anthracite mine, and there were but three cases in which individual men were fatally burned by gas ignitions. This record of immunity from serious gas explosions is probably the best in the history of anthracite mining in the past 50 years.

Since the establishment of the Bureau of Mines in 1910, one of the Bureau's 10 mine-rescue stations has been kept in operation in the anthracite mining region. One of the Bureau's mine-rescue cars has been maintained there also, the car personnel giving safety instruction to the miners, and also being available for rescue work at mine fires and explosions.

● THE Ninth Annual Mining Institute of the College of Mines, University of Washington, Seattle, was given this year during the week of January 20. The program consisted of a series of lectures given by staff members of the university and outside speakers from the industry; exhibits and demonstrations of machinery and equipment; timely motion pictures; and a special trip to the Tacoma smelter, where plant operations were observed and supplemented by talks from the operating personnel of the organization. Special features of the Institute this year were the luncheon and program on Monday with mining groups of the city; the joint dinner and meeting with the North Pacific Section, American Institute of Mining Engineers, at which the operation of the Securities Act of British Columbia were explained; a luncheon meeting at which the Student Mines Society had charge of the program; and one day's program devoted especially to mining in Alaska.

● THE DEPARTMENT OF COMMERCE announces Secretary Roper's acceptance of the chairmanship of the Jury of Award which will judge the outstanding achievement among trade associations during the past three years.

The award is given to the trade association judged by the jury as having performed distinguished service to its industry, to the public, and to industrial development. Trade associations throughout the United States will participate. The award—a bronze medallion signifying achievement through cooperative effort—was founded in 1929 and is sponsored by the American Trade Association Executives, a national organization of trade association men. Presentation of the award will be made by Secretary Roper at the A. T. A. E's semiannual meeting in Washington in April. The

four judges assisting Secretary Roper in judging entries are: Thomas J. Watson, president, International Business Machines Corporation; Merle Thorpe, editor, *Nation's Business*; Arthur D. Whiteside, president, Dun & Bradstreet, Inc.; and Walter Dill Scott, president, Northwestern University.

● IN THE budget message to the Congress recently the President asked for a total of \$1,595,000 for the Bituminous Coal Commission. The specific request was \$1,155,000 to finance the activities of the Coal Commission for the next fiscal year. In addition the President requested a deficiency appropriation of \$440,000 for administration of the Coal Act during the balance of the current fiscal year.



● MINE No. 6, at Millfield, Ohio, was taken over by the Sunday Creek Coal Company in 1929, and since that time has had a steady growth. At present it has a daily output of approximately 3,000 tons, which places it in the position of being the largest operation in the Hocking Valley District. This mine regularly employs 760 miners.

The coal is prepared for the market in a four-track tippie, which was completely rebuilt and re-equipped when the mine was taken over in 1929. Although only four grades of coal can be produced at one time, interchangeable screens are provided, particularly for the production of various special sizes of stoker nut coal. In addition to this industrial stoker coal, the larger sizes produced at No. 6 have found considerable favor in the domestic market.

The Middle Kittanning, or No. 6 seam, is mined and is reached by means of a 186-ft. shaft. Steam is used as a source of power in hoisting coal and ventilating the mine. Other than this, however, electrical equipment is used throughout the mine. Not only main haulage, but also gathering haulage is completely electrified. The coal is cut entirely with 50-hp. top-cutting arcwall machines, insuring larger coal as well as better preparation. However, the actual mining is done by hand, which accounts for the large number of miners employed.

Purchased power is used exclusively at this operation. It is converted to 250 volts d. c. for use inside the mine by means of five 150-kw. rotary converters, four of which are located underground and connected to the primary source of power by means of bore-hole cables. The converter sets are so located that they are as near as possible to the working places. However, the large number of working places necessary to produce the tonnage mined from this operation prevents the sources of power being located close to all working territories. Therefore, in order to insure an adequate supply of power to the machines, motors and pumps, 4/0 feeder lines on all main entries are carried on O-B hangers along with the trolley wires by employing the O-B Dual Bulldog clamps. The use of 6-ton gathering locomotives necessitates 4/0 trolley lines on all butt entries.

In order to handle the 40 to 50 car trips necessitated by long hauls, one 8-ton and two 10-ton locomotives are operated on main haulage. The heavy load arising from the use of the 6-ton gathering locomotives and the 50-hp. cutting machines calls for careful supervision of track and wire in all parts of the mine in order to provide an adequate supply of power with a minimum of line loss between the converter and the equipment.

With reference to power supply, Mr. Smith says, "This problem is well cared for through the use of O-B type AW-13 bonds on all entry track with frequent cross bonding. This applies not only to main entries, but to all working territories. Without this careful attention to bonding, maintenance of equipment would



The coal is prepared for the market in a four-track tippie which was completely re-equipped when the mine was taken over in 1929

become costly to the point of being prohibitive in so large an operation.

In order to simplify the supervision and maintenance of the long, numerous, and widely spread motor lines, as well as a means of providing safety, Type M-3 section insulators are provided, not only at all main junctions but on all of the territories in the mine. This affords a relatively simple method of isolating any power troubles which might arise. The numerous items of equipment operating in this mine, as well as their widespread locations, might well cause considerable difficulty in the way of power interruptions if it were not possible to isolate quickly and easily any short that is liable to occur from time to time.

O-B materials which have contributed to the efficient operation of this mine are LW welders, Type D frogs, Bulldog clamps, Universal-2 hangers, Form-3 roof drills, security Form-2 feeder-wire insulators, insulated turnbuckles, and A-3 expansion bolts.

From Reports: U. S. Bureau of Mines

● THE VALUE of the gold, silver, copper, lead, and zinc produced from mines in Washington in 1935 was approximately \$399,920, compared with \$506,945 in 1934. Compared with production in 1934, the 1935 output of gold increased slightly (1,600 oz.); the output of silver increased 6,780 oz.; the production of lead decreased from 581,298 pounds to 180,000 pounds; zinc decreased from 3,852,419 pounds to 2,170 pounds; and the output of copper increased from 13,900 pounds to 101,850 pounds.

● REPORTS from mines, smelters, and refineries indicate that the value of recoverable gold, silver, copper, lead, and zinc produced from mines in Arizona in 1935 was approximately \$36,269,000, a decided increase from \$23,292,150 in 1934.

● THE VALUE of the gold, silver, copper, lead, and zinc produced from mines in Idaho in 1935 was \$19,453,700, com-

pared with \$15,277,669 in 1934, an increase of \$4,176,031. Substantial gains were recorded in the output of silver, copper, lead, and zinc, but there was a slight decrease in the gold output.

● ELEVEN MONTHS actual mine production with an estimate by the mine operators for December indicates that the output of gold, silver, copper, lead, and zinc from New Mexico ores and gravels in 1935, in terms of recovered and estimated recoverable metal, was 33,560 oz. of gold, 1,052,900 oz. of silver, 5,045,000 pounds of copper, 15,385,000 pounds of lead, and 44,834,000 pounds of zinc. These figures compare with a production in 1934 of 27,307 fine oz. of gold, 1,061,775 fine oz. of silver, 23,630,000 pounds of copper, 18,729,000 pounds of lead, and 53,043,000 pounds of zinc.

● REPORTS from metal mines and receipts at smelters indicate that the production of mines in Texas in 1935 was 622 oz. of gold, 976,900 oz. of silver, 33,000 pounds of copper, and 1,115,000 pounds of lead.

● RECEIPTS at smelters and the United States mint for 11 months, with an estimate for December, indicates that metal mines in Wyoming in 1935 produced, in terms of recovered metals, 4,112 oz. of gold, 793 oz. of silver, 2,000 pounds of copper, and 6,000 pounds of lead.

● REPORTS from metal mines and receipts at smelters and the United States mint indicate that the production of metal mines in South Dakota in 1935 was 563,952 oz. of gold, 142,513 oz. of silver, and 7,000 pounds of lead. This compares with the production in 1934 of 486,119 oz. of gold and 99,741 oz. of silver. The number of producing lode mines increased from 8 in 1934 to 13 in 1935; the number of placer operations (mostly individuals) is estimated at 258, the same as in 1934. The gross value of the South Dakota production in 1935 at average yearly prices of \$35 per ounce of gold, \$0.738 per ounce of silver, and

\$0.040 per pound of lead was: Gold \$19,738,320, silver \$105,175, lead \$280; total, \$19,843,775. In 1934, at the average weighted price of \$34.95 per ounce of gold and \$0.64646464+ per ounce of silver, the value was: Gold \$16,989,858, silver \$64,479; total, \$17,054,337.

● **THE MINE** production of gold, silver, copper, lead, and zinc from ores and gravels in California in 1935, in terms of estimated recovered metals, was valued at \$31,534,999, an increase of \$5,750,816 over 1934. The mining revival started in the state in 1933 after a period of more or less dormancy, continued through 1934, and reached the high point in 1935, with the year closing with no apparent cessation of established activity. The industry in 1935 was characterized not by "bonanza days" or discovery of new mines but rather by the intensive working of low-grade ore bodies, bringing mines actively developed the previous year into production, and scouting for further profitable gold-bearing properties.

● **THE MINE** production of gold, silver, copper, lead, and zinc in Oregon in 1935, in terms of estimated recovered metals, was 51,800 fine oz. of gold, 112,000 fine oz. of silver, 397,000 pounds of copper, 48,500 pounds of lead, and 9,000 pounds of zinc, valued in all at \$1,931,358, a gain of \$715,283, or 59 percent, over 1934.

● **REFINERY** production of lead from domestic sources was 5 percent above the output in 1934. Production from foreign sources remained at the low level established in 1933 and amounted to only 8 percent of the domestic output from foreign sources in 1928. Imports of lead in pigs, bars, etc., were larger than in any other year since 1929 but represented only a small part of available supply. Final figures on exports of pig lead will probably indicate a drop of 10 percent or more in this class. Apparent consumption of primary lead in the United States was about 6 percent higher than in 1934 but was still less than one-half of the annual average for 1925-29. The average quoted price for lead in 1935 was only about 5 percent above that in 1934, but the average price for December, 1935, was 25 percent higher than that for December, 1934. About 175,700 tons of primary domestic desilverized lead, 103,500 tons of soft lead, and 36,200 tons of desilverized soft lead were produced in 1935—making a total output of about 315,400 tons of refined lead from domestic ores. Corresponding figures in 1934 were 175,073 tons of desilverized lead, 102,024 tons of soft lead, and 22,744 tons of desilverized soft lead, making a total of 299,841 tons. The output of lead smelted and refined from foreign ore and bullion was about 12,400 tons, as compared with 11,395 tons in 1934. The total primary lead smelted or refined in the United States in 1935 was thus about 327,800 tons, an increase of about 5 percent as compared with the total of 311,236 tons in 1934.



In the Coal Producing District of West Virginia.

Plants that treat primary materials mainly produced 44,100 tons of secondary lead in 1935 compared with 33,557 tons in 1934. Therefore, the total output of primary and secondary refined lead at primary refineries was 371,900 tons, as compared with 344,793 tons in 1934, an increase of 8 percent. Antimonial lead produced at primary refineries in 1935 amounted to about 15,100 tons, as compared with 16,607 tons in 1934.

Imports of lead as "pigs, bars and old" amounted to 1,279 tons during the first 11 months of 1935 compared with 285 tons in all of 1934. Base bullion imported during the same period totaled 2,328 tons compared with 2,450 tons during the entire year 1934. Exports of lead in pigs, bars, etc., during the first 11 months amounted to 4,425 tons and exports of lead sheets during that period were 317 tons. Total exports of pig lead for the entire year 1934 were 5,906 tons, and of lead sheets were 153 tons.

By excluding the stocks of lead at smelters and refineries and by estimating the amount of lead exported with benefit of drawback (for which figures for only 9 months are available), the new supply of lead made available for consumption in 1935 is calculated at about 315,500 tons, an increase of 6 percent from 298,141 tons in 1934.

● **PRELIMINARY** statistics covering copper production, foreign trade, prices and smelter and refinery stocks in 1935 indicate marked improvement over 1933-34 in certain phases of the copper industry. Smelter production from domestic ores increased 53 percent over 1934. Production of primary refined copper from domestic and foreign sources showed a gain of 33 percent over 1934 and the proportion of foreign to domes-

tic copper in United States refinery output declines in 1935. Imports of copper, principally for smelting, refining and export, increased somewhat in 1935 but the quantity earmarked for consumption in the United States was no larger than in 1934 and final figures will probably show a slight decrease. Exports of metallic copper in 1935 were relatively unchanged from 1934. Stocks of refined copper at refineries in the United States were 31 percent less than at the end of 1934 while stocks of blister and unrefined copper at smelters, in transit to refineries and at refineries are estimated to have remained unchanged during the year. Total inventories of refined and unrefined copper at the end of 1935 were only 56 percent of the record stocks on hand at the end of 1932. Indicated domestic consumption of copper increased 32 percent over 1934 and was equal to 55 percent of the average annual consumption in 1925-29. The average price for copper was slightly higher in 1935 than in 1934.

● **CONTINUED** improvement in the lead pigments industry in 1935 is evidenced by gains in the sales of all items covered by the preliminary survey. Total sales of white lead (dry and in oil) were higher than at any time since 1931, and sales of red lead, orange mineral, and basic lead sulphate were the highest since 1930; sales of litharge were the largest recorded since 1929.

● **GROUP** life insurance policies have recently been acquired by the Coal Creek Coal Company, and the Fox Hill Mining Company, for the protection of their employees. Protection of \$1,000 each has been granted these employees who total 103 workers.

● **THE SUPREME COURT** recently granted petitions for writs of certiorari in four cases all affecting the Guffey Coal Act. This action means that there will almost certainly be a final decision from the High Court by April or May on the validity of the bituminous coal law.

Date for argument on the cases has not been set but is expected to be not later than some time in March. While there is no guarantee that the Court will pass on the full question of constitutionality, it is considered likely that it will, inasmuch as three principal issues of the case—price fixing, whether the 15 percent tax is a tax or a penalty, and the labor provisions—are involved in the writs applied for.

The Supreme Court action involves four cases, all up on writs of certiorari. These include the original action of James W. Carter against the Carter Coal Company in which he sought to have the company enjoined from signing the coal code; the action in which Guy T. Helvering as Internal Revenue Commissioner, appealed from a decision which permanently enjoined collection of the penalty tax; the action of R. C. Tway Coal Company against Glen (internal revenue collector in Kentucky), and the suit of Clark against the R. C. Tway Company in which the plaintiff as a stockholder asked that the company be enjoined from signing the code.

While the record is not as complete on all phases of the Act in the Tway cases, the Carter record is voluminous, and legal opinion is that the final Supreme Court decision will encompass the complete question of constitutionality. Meanwhile, a total of over 50 actions have been brought by coal mining companies seeking injunctions against application of the Act, on constitutional grounds.

● **IN A MEMORANDUM** to secretaries of bituminous coal producers boards the Coal Commission directs their attention and that of all code members to a suit filed by the Pittsburgh Terminal Coal Corporation against Henry D. Bell, Collector of Internal Revenue and others for an injunction restraining payment of tax on the ground that other producers securing injunctions hold an unfair competitive advantage. Upon this action Judge R. B. Gibson directed an order, returnable January 8, 1936, in the court, restraining the Collector of Internal Revenue from collecting or attempting to collect any part of the tax.

● **SECRETARY OF THE INTERIOR** on December 27, accepted deeds conveying 176,429.80 acres of land in Virginia for the establishment of Shenandoah National Park. Acceptance of these deeds has been held up by litigation testing the state's right to condemn property for Federal park purposes which litigation ended in a Supreme Court decision upholding the state. Assurances have been

TRADE AGREEMENTS CALENDAR

Country	Date of Issuance of Notice	Latest Date for submitting written statements	Date for Oral Presentation of views
	1934	1934	1934
Costa Rica	September 7	October 15	October 22
Guatemala	September 7	October 15	October 22
Nicaragua	September 7	October 15	October 22
Salvador	September 7	October 15	October 22
Spain	September 17	November 5	November 12
Switzerland	October 23	December 10	December 17
	1935	1935	1935
Finland	December 19	February 4	February 11
Italy	January 16	March 4	March 11
France and its colonies, dependencies, and protectorates other than Morocco	pro-April 30	June 17	June 24

TRADE AGREEMENTS SIGNED

Countries	Signed	Effective
Cuba	August 24, 1934	September 3, 1934
Brazil	February 2, 1935	January 1, 1936
Haiti	March 28, 1935	June 3, 1935
Belgium	February 27, 1935	May 1, 1935
Sweden	May 25, 1935	August 5, 1935
Colombia	September 13, 1935	
Canada	November 15, 1935	January 1, 1936
Honduras	December 18, 1935	
Netherlands	December 20, 1935	February 1, 1936

given that provisions will be made to take care, outside the park area, of most of the families resident in the park by the Federal Resettlement Administration under funds available for such a purpose, and additional funds are available by FERA for the state to provide places for families who may not be eligible under the Federal Resettlement plan.

viser to the American Consular Service and reporting on the mineral industries in Italy during the last few months, has been transferred to the American Consulate in Berlin, Germany. This new mineral service in Europe is under the direction of the Foreign Mineral Service Division of the United States Bureau of Mines.

Among those attending the conference of operating men at Pittsburgh on January 31 and February 1 were W. W. Dartnell, F. F. Jorgensen, M. D. Cooper, H. B. Husband, R. V. Clay, T. F. McCarthy, M. W. Horgan, C. W. Gibbs, A. J. Ruffini, J. J. Sellers, D. D. Wilcox, W. P. Vance, E. A. Siemon, T. W. Guy, R. G. Pfahler, John H. Richards, Wm. Crichton, Jr., and F. G. Smith.

W. A. Irwin, president of the United States Steel Corporation, in a recent address before the Union Club in Chicago stated that "Recovery will continue and eventually reach a state of normalcy as uncertainties are eliminated. Traditional initiative, courage and enterprise of our people will again influence a commercial and industrial activity which will tax our capacity to fulfill. Anticipating the approach of that day which is as certain as death and taxes, it behooves not only the steel industry but industry and commerce throughout the land to be prepared to contribute their full share to the economic and social advancement of our country."

C. E. Cowan, vice president of the Monroe Coal Company, presided at the meeting of the Pennsylvania section of the Program Committee developing the annual May meeting of the American Mining Congress. Mr. Cowan is chairman for this district.

U. S. COAL PRODUCTION—NET TONS

	Bituminous Coal	Pennsylvania Anthracite	Total Coal
1897-20...	3,000	12,000	15,000
1921.....	1,322	1,322
1929.....	104,800	215,272	320,072
1940.....	1,102,931	967,108	2,070,039
1950.....	2,880,017	4,138,164	7,018,181
1960.....	6,494,200	8,115,842	14,610,042
1970.....	17,371,305	15,664,275	33,035,580
1980.....	42,831,758	28,649,812	71,481,570
1985.....	72,824,321	38,335,974	111,160,295
1990.....	111,302,322	46,468,641	157,770,963
1995.....	135,118,193	57,999,337	193,117,530
2000.....	212,516,112	57,367,915	269,884,027
2005.....	315,062,785	77,659,850	392,722,635
2010.....	417,111,142	84,485,236	501,596,378
2013.....	478,435,297	91,524,922	569,960,219
2015.....	442,624,426	88,995,061	531,619,487
2016.....	502,519,682	87,578,493	590,098,175
2017.....	551,790,563	99,611,811	651,402,374
2018.....	579,385,820	98,826,084	678,211,904
2019.....	465,860,058	88,092,201	553,952,259
2020.....	568,666,658	85,698,249	654,364,907
2021.....	415,921,950	90,473,451	506,395,401
2022.....	422,268,099	54,683,022	476,951,121
2023.....	564,564,662	93,339,009	657,903,671
2024.....	483,686,538	87,926,862	571,613,400
2025.....	520,052,741	61,817,149	581,869,890
2026.....	573,366,985	84,437,452	657,804,437
2027.....	517,763,352	80,095,584	597,858,936
2028.....	500,744,970	75,348,069	576,093,039
2029.....	534,988,593	73,828,195	608,816,788
2030.....	467,526,299	69,384,837	536,911,136
2031.....	382,089,396	59,645,662	441,735,058
2032.....	309,709,872	49,855,221	359,565,093
2033.....	333,630,533	49,541,344	383,171,877
2034.....	359,368,022	57,168,291	416,536,313
2035.....	367,200,000	59,800,000	418,000,000

Personal Notes

E. J. Newbaker, vice president, The Berwind-White Coal Mining Company, is on a vacation trip to southern and South American ports. He will return to his home at Windber, Pa., early in March.

Charles Will Wright, foreign mineral specialist who has been acting as ad-



J. F. McCarthy

J. F. McCarthy, president, The Hecla Mining Company, Wallace, Idaho, has been in New York.

T. J. Thomas, president of the Valier Coal Company, is on a vacation trip to Florida.

H. H. Taylor, Jr., vice president of the Franklin County Coal Corporation, spent the Christmas holidays with his father at Corpus Christi, Texas.

D. W. Buchanan, Old Ben Coal Corporation; **Hubert Howard**, Binkley Coal Company; and **Geo. B. Harrington**, Chicago, Wilmington & Franklin Coal Company, appeared before the Bituminous Coal Commission at the hearing to obtain evidence relating to the need for immediate establishment of prices in the coal industry.

R. L. Ireland, Jr., is representing the coal industry of the State of Ohio in the Great Lakes Exposition, which will glorify Ohio industries in a miniature World's Fair to begin in June, 1936.

At meetings held on December 27 **Edward W. Scheer** was elected president of the Reading Company and of the Central Railroad of New Jersey, to succeed the late **Charles H. Ewing**. **R. W. Brown**, vice president and general manager of the Jersey Central, was elected vice president of operation and maintenance of both companies, to succeed Mr. Scheer. Both men came up from the ranks, Mr. Scheer having entered railroad service in 1890 as a stenographer, and Mr. Brown entering the service of the Baltimore & Ohio as a laborer in 1901.

W. Val de Camp and **William W. Lynch** have gone to Bolivia.

H. G. Moulton has been promoted to the position of superintendent of the Lloyd Mine of the Cleveland-Cliffs Iron Mining Company at Ishpeming.

Paul Weir, vice president of Bell & Zoller Coal Company, delivered an address before the American Wood Preservers Association at its annual meeting at Memphis on January 29.

George C. McFadden, Peabody Coal Company, has been confined to St. Francis Hospital, at Evanston, Ill., for several weeks.

J. D. Francis, president of the Island Creek Coal Company, was elected a director of the American Mining Congress at its annual meeting held in New York January 15.

John T. Ryan, president of the Mine Safety Appliances Company, Pittsburgh, with Mrs. Ryan is on a short vacation trip to Florida.

Myron C. Taylor on January 6 gave a dinner to **Wm. J. Filbert** on behalf of officials and directors of the United States Steel Corp., which was attended by the leading steel executives of the country. Mr. Filbert retired as chairman of the Finance Committee of the corporation on January 1.



CHAS. H. SEGERSTROM

Among the visitors to the offices of the American Mining Congress during January were: **Robert S. Palmer**, secretary, Colorado Chapter, A. M. C., Denver, Colo.; **R. L. Ireland, Jr.**, V. P. Hanna Coal Company, Cleveland, Ohio; **Herbert C. Jackson**, Pickands Mather & Co., Cleveland, Ohio; **Howard I. Young**, president, American Lead, Zinc & Smelting Co., St. Louis; **H. B. Fernald**, Loomis Sufferin & Fernald, New York City; **Charles H. Segerstrom**, president, Carson Hill Gold Mng. Co., Sonora, Calif.; **D. A. Callahan**, president, Callahan Zinc-Lead Company, Wallace, Idaho; **M. D. Harbaugh**, secretary, Tri-State Zinc and Lead Ore Producers Assn., Miami, Okla.; **Dr. E. H. Wills**, president, New Mexico School of Mines.

The Board of Directors of the U. S. Steel Corp., at its meeting on January 7, created three additional vice presidencies. **Harold L. Hughes** was elected vice president with executive duties assigned by the president. **W. A. Forbes** was elected vice president with supervision over by-product coke plants, and **Charles H. Rhodes** was elected vice president with general supervision over purchases.

M. W. Von Bernewitz is now affiliated with the United States Bureau of Mines, editing mineral trade notes.

William Wraith is on a tour of inspection of the Andes Copper Mining Company in Chile.

Stanly A. Easton has been elected president of the Idaho Mining Association.

C. N. Shuette has returned to his home in San Francisco after an extended visit in the east.

Otto Sussman has been elected to the directorate of the Consolidated Copper Mines Corporation.

H. deWitt Smith has been elected to the Board of the Cusi Mexicana Mining Company.

B. H. Schull, general manager of the Binkley Coal Company, has been elected president of the Indiana Coal Mining Institute.

Dr. Charles Camsell, Deputy Minister of Mines, Ottawa, Canada, was a recent visitor at the Anthracite Institute Laboratory. He was accompanied by officials of the Philadelphia and Reading Coal and Iron Company.

Died

Dr. Elwood Mead died at his home in Washington, D. C., on January 26, following an illness of several weeks. Dr. Mead has been Commissioner of Reclamation since 1924.

The death of **Henry E. Harman**, president of the Warrior Coal Company, Warriormine, W. Va., occurred recently. Funeral services were held at Tazewell, Va. Mr. Harman was also president of the Harman Coal Corporation, with offices at Harman, Va.

Glen W. Traer, vice president of Truax-Traer Coal Company, Chicago, Ill., died at Evanston, Ill. He was 67 years old. The death of **Elmer M. Truax**, vice president of the same company, with offices at Minot, N. Dak., occurred the previous week, also at Evanston, Ill.

Mechanization Trends

MODERN Coal Mining Practice was the subject for discussion at a conference of the District and Project Committees, of the Operators Section, of the Coal Division, The American Mining Congress, held at the William Penn Hotel, Pittsburgh, Pa., January 31 and February 1. These committees have started a series of studies on various phases of production problems, and the first reports of the committees were submitted at the conference. E. J. Newbaker, vice president, The Berwind White Coal Mining Company, is the national chairman of the Coal Division. He is assisted in the work by a group of approximately 300 operating men. The purpose of the Operators' Committee work is concisely outlined in the agenda for the meeting, which said:

"Correct practice, safe working, and proper equipment are the essentials for economical coal mine operation, but no one method of performance nor one kind of equipment will produce the most satisfactory results under all conditions. A survey and compilation of the representative methods used in the different coal fields will serve to bring out the best performance and through a study of these successful operations, together with the various factors involved, certain basic mining principles will become evident."

Approximately 75 men attended the Pittsburgh conference. They represented the districts of Central Pennsylvania, Pittsburgh, Southwestern Pennsylvania, Northern West Virginia, Central West Virginia, New River West Virginia, Virginia, Ohio and Illinois. Other districts, particularly the far west, whose members were unable to attend the meeting, submitted written reports. The conference had for consideration a comprehensive assembly of data from all of the principle producing coal fields.

The major purpose of the conference was to consider methods of compiling the data submitted by the Project Committees for each district, into national Project Reports. Each Project Committee, composed of representatives from all the districts, held separate sessions, and considered the data and reports that had been sent in to them. Their recommendations as to how each subject should be handled, and the manner in which the data should be compiled were then presented to a general meeting of the entire group.

The following program indicates the order in which the subjects were considered, and the following list of reports indicates the scope of the data compiled by the districts on which the recommendations of the conference were based.

Friday Morning Session—Chairman, J. D. Conover, secretary, American Mining Congress.

10:00 A. M.—Opening address by the chairman.

"Cooperation of Manufacturers," C. B. Officer, Sullivan Machinery Co.
"Committee Progress," G. B. Southward, American Mining Congress.

10:30 A. M.—The Project Committees, composed of representatives from the different districts, went into separate meetings to discuss the reports received from the districts and to prepare the recommendations made at the following general sessions.

Friday Afternoon Session—Chairman R. V. Clay, Hanna Coal Company.

1:30 P. M.—Project Reports.

Face Preparatory—D. D. Wilcox, Superior Coal Co. Discussion by district representatives.

Mechanical Loading—John H. Richards, Hanna Coal Co. Discussion by district representatives.

Conveyor Mining—T. F. McCarthy, Clearfield Bituminous Coal Corporation. Discussion by district representatives.

Accident Prevention—Wm. Crichton, Jr., Johnstown Coal & Coke Co. Discussion by district representatives.

Mining Systems—F. G. Smith, Poston Consolidated Coal Co. Discussion by district representatives.

Saturday Morning Session—Chairman, W. W. Dartnell, Valley Camp Coal Co.

9:30 A. M.—Project Reports.

Coal Mine Tracks—R. V. Clay, Hanna Coal Company. Discussion by committee members.

Power Distribution—M. W. Horgan, Monongahela West Penn Co. Discussion by district representatives.

Mine Maintenance—F. F. Jorgensen, Consolidation Coal Co. Discussion by district representatives.

Surface Preparation—T. W. Guy, consulting engineer, Charleston. Discussion by district representatives.

List of reports submitted:

1. Cutting Bit Treatment—South Central Illinois District.
2. Conveyor Loading—Central Pennsylvania District.
3. Mechanical Loading—Ohio District.
4. Mechanical Loading—South Central Illinois District.
5. Accident Prevention—New River West Virginia District.
6. Accident Prevention—Wyoming-Montana District.
7. Concentrated Mining Systems—Utah District.
8. Concentrated Mining Systems—Ohio District.
9. Mining Systems—New River West Virginia District.
10. Gathering Haulage—New River West Virginia District.
11. Gathering Haulage—Northern West Virginia District.
12. D. C. Power Distribution—South Central Illinois District.
13. D. C. Power Distribution—Northern West Virginia District.
14. D. C. Power Distribution—New River West Virginia District.
15. D. C. Line Loss Chart—Northern West Virginia District.
16. Test on Mine Fans—Virginia District.
17. Materials for Roof Support—Ohio District.
18. Wood Ties on Main Haulageways—Committee on Coal Mine Tracks.

Prior to the conference many members of the committee attended the final

(Concluded on page 58)



Present Trends In Taxation

(Continued from page 13)

according to the modern philosophy, are:

- I—An object upon which to spend the money. This object must have the support of an organized group with militant leadership and must have sufficient backing to render it politically advantageous to provide funds.
- II—An object of taxation which will not affect *directly* a considerable number of voters, who may rise in revolt.
- III—An apathetic citizenship which does not care particularly who pays the money as long as they are not directly affected, and who are willing to endorse schemes proposed by militant groups for improvement in services already rendered by government or extension of functions to better serve the people. Local pride and humanitarian impulses are the controlling factors.

It can be readily seen that under this new attitude toward the spending of money and the levy of taxes the administrative branch of the Government must play a more important part than under the old scheme of things. When the money for public expenses was coming largely from general taxation, the legislative branch, representing the people in all the counties of the state, insisted on having the money spent under its direction and more carefully scrutinized the expenditures. Nowadays but a small proportion of the whole is spent under direct appropriations. A comparison of the growth in Idaho of special funds which are administered directly by executive officials and not subject to the limitation of appropriations is most interesting. I am going to give you the principal items showing increased receipts going into special funds to be spent in this manner. The comparisons again are for the 10-year period:

	1924-26	1932-34
Agricultural Dept.....	\$112,492.82	\$236,206.27
Banking Bureau.....	None	29,475.81
Motor Fuels.....	1,920,115.43	5,505,374.76
Motor Vehicles.....	11,497.50	131,319.58
Occupational Licenses..	None	27,017.45
Public Works (including state highways).....	3,745,510.16	6,845,535.07
Store Licenses.....	None	39,766.78
Beer Tax.....	None	97,390.30
Contractors' Licenses...	None	9,000.00

All of these funds will be found to have materially increased during the period covered by the present biennium. In fact, the tendency of such funds to increase from year to year is inevitable. There is not sufficient tax resistance to overcome the demand for increased spending, and in the absence of such resistance the will of legislators to vote increases in rates is more easily moved. An example of this is the increase of the excise rates on premium of insurance companies, voted by the Idaho Legislature in 1933.

There is no greater service which can be performed for a state or your nation than to insist upon the election to Congress and to the state legislature of those who will maintain the dignity and power of the legislative branches of our dual governments. Do not send agents to these bodies. Send independent citizens, determined to exercise the functions of lawmakers, uninfluenced by the threats or cajolery of those who, under our system of government, are the agents to carry out the will of the people as represented by their legislative representatives.

The present tendency is entirely in the direction of abdication of legislative functions and the building up of vast power in the executive branch. We call this bureaucracy, a system which has destroyed free peoples in the past and will destroy us. Executive power once granted never diminishes. It will take a practical revolution to destroy the system which is infesting the entire country with its agents, snoopers, and spies. It grows upon its own food. It constitutes

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+ + +

an army of propagandists, which appeals to groups and classes and enlists on its side militant organized minorities which seem irresistible. Productive industry in the end must pay the bill.

Study tax bills and realize how, year by year, your contribution to government has been growing. Visualize if you can the possibilities of the future when it shall have become the settled philosophy of this nation that wealth, however obtained, has been created for the use of the state in such proportion as may be determined by those who can sway the populace by promises of participation in the fruits of the earth even though, like the lilies of the field, "they toil not, neither do they spin."

Mechanization in The Coal Industry

(Continued from page 37)

Sales of loading equipment of one type or another are reported for nearly every coal-mining State. For some States the figures cannot be shown without disclosing individual business, but Table 3 gives the sales of mobile loaders and scrapers by groups of States. In 1935 the manufacturers reported selling 77 machines to bituminous operators in the Northern States of Pennsylvania, Ohio, Indiana, and Illinois. The sales may be compared with the total of 483 units in active use in these same States during the year 1934. It appears, therefore, that the sales in 1935 represented an increase over the existing installations in the North of 15.9 percent. The number of machines sold to operators in the Southern States was less—41 units—but these 41 units constituted an increase of 95.3 percent over the number of machines in use in 1934. In addition, 11 machines were sold to operators in the Western States. Over the bituminous field as a whole, the sales of mobile loaders and scrapers in 1935 added 19.8 percent to existing equipment.

The number of machines in this class

sold to mines in the anthracite region was 8, an indicated increase over the existing equipment of 1.5 percent.

Table 4 presents a similar comparison of the sales of duckbills and face conveyors by groups of states. In these classes of equipment a total of 354 units were sold to operators in the anthracite region, consisting largely of shaker conveyors and shaker drives. Sales in the bituminous fields amounted to 306 units, of which 90 went to the northern states, 136 to the southern states, and 80 to the western states. Ninety-six units were sold in West Virginia, 78 units in the Pennsylvania bituminous mines, and nearly 50 in Wyoming. Because of differences in definition, the figures of sales are not exactly comparable with those of number of machines in use in 1934, and the indicated increase in percent shown in the last column of the table is probably above the fact. It will, however, serve to show the areas in which the new installations have made the greatest proportionate increase in relation to existing equipment. The largest percentage increase is in the bituminous mines of the southern states, particularly in West Virginia.

It is clear that the output of mechanically loaded coal increased substantially in 1935; and the outlook is for further gains in 1936.

Coal Convention and Exposition Makes Progress

(Continued from page 47)

La-Del Conveyor & Mfg. Co.
Mine Safety Appliances Co.
John A. Roebling's Sons Co.
Brown-Fayro Company
Electric Railway Equipment Co.
Mancha Storage Battery Locomotive Company.

Hercules Powder Co.
Goodman Mfg. Co.
Simplex Wire & Cable Co.
General Electric Co.
Ohio Brass Co.
Tide Water Oil Company
Penn Machine Co.
Electric Railway Improvement Co.
Macwhyte Company
Wood Preserving Corp.
Texas Company
Coal Mine Equipment Co.
Austin Western Wheeled Scraper Co.
Chicago Pneumatic Tool Co.
Roberts & Schaefer Co.
Sullivan Machinery Co.
S K F Industries, Inc.
Automatic Reclosing Circuit Breaker Company.

A. Leschen & Sons Rope Co.
Atlas Powder Co.
St. Louis Power Shovel Co.
Thomas A. Edison, Inc.
Timken Roller Bearing Co.
Joy Mfg. Co.
Westinghouse Elec. & Mfg. Co.
Fairbanks, Morse & Co.
Kanawha Mfg. Co.
Post-Glover Elec. Co.
Ahlberg Bearing Co.
Electric Storage Battery Co.
Morrow Mfg. Co.
Watt Car & Wheel Co.
Weir Kilby Corp.
Hulburt Oil & Grease Co.
E. I. du Pont de Nemours & Co.
Safety Mining Co.
Enterprise Wheel & Car Corp.
Flood City Brass & Electric Co.
W. S. Tyler Co.
Pure Oil Co.
Pure Carbon Co.
Safety First Supply Co.
Philco Radio & Television Corp.
Yale & Towne Mfg. Co.
Duncan Foundry & Machine Works.
McGraw-Hill Publishing Co.
L. W. Shugg, General Electric Co., will serve as honorary director of exhibits.

The committee, both operators and manufacturers, are determined to make this 1936 meeting one which will be remembered for a long time, and from the start they have made, there is no doubt of their success.

● **COMPTROLLER GENERAL McCARL** has issued a ruling directed to the Postmaster General on January 2 relative to an interpretation of Section 14(b) of the Bituminous Coal Conservation Act of 1935. This section requires contrac-

tors on public works or services, if they use bituminous coal in such work or service, to purchase from code producers only. Interpretation in the light of the following questions was asked by the Postmaster General:

1. In connection with the entering into of leases for post office quarters (a) where the lessor undertakes to furnish heat; (b) where the lessor undertakes to furnish fuel; and (c) where the lessor is under no obligation to furnish either heat or fuel.

2. In the case of contracts for supplying electric, gas, water, or steam services to Government buildings or leased quarters.

McCarl ruled that the provisions of Section 14(b) are required in every contract for any public work or service. In every instance above, with the exception of where a lessor is under no obligation to furnish heat or fuel but merely leases the premises the provisions of Section 14(b) are mandatory.

The Coal Industry In West Virginia

(Continued from page 29)

The volume of business in first-aid equipment has increased materially during the year, which was due to the great interest taken in first-aid meets held throughout the state in 1935, and shows that the mine managers are putting forth every effort to reduce mine accidents.

The things outlined constitute a resume of developments in the coal industry of West Virginia in 1935. In a year of stress, such as it has been, when so many problems were pressing for solution, and with competition so intense, it seems worthy of comment that the industry provided a livelihood for about 100,000 miners during the year and paid them approximately \$112,000,000 in wages and maintained its position of being West Virginia's greatest industry.

● **THE COLORADO CHAPTER** of the American Mining Congress and Colorado Mining Association have recently issued "The Mining Yearbook, 1935-1936," containing a number of informative discussions of mining in Colorado. This is most timely, in view of the forthcoming meeting of the Western or Metal Mining Division of the American Mining Congress, to be held in Denver, September 28-October 2.

Jesse F. McDonald, chairman of the Western Division, through this publica-

tion extends a cordial invitation to all engaged in the mining industry to attend the Denver meeting, which will be one of the largest gatherings of metal mining men ever held.

Among the articles appearing in the "Yearbook" are discussions by Wm. B. Daly on "Helping Metal Mining Solve Its Problems"; "Small-Scale Gold Mining and the Bureau of Mines," by E. D. Gardner; and a biographical account by George M. Taylor of his "First Trip to Cripple Creek." Governor Ed. C. Johnson, of Colorado, in a foreword says: "With better prices prevailing for the precious metals today, we need more than anything else a revival of the spirit which brought about the discoveries and developments of our early history."

Robert S. Palmer, secretary of the Colorado Chapter of the American Mining Congress, answers this challenge by stating: "The coming convention of the Metals Division of the American Mining Congress should serve to stimulate this idea, and will undoubtedly be quite helpful in bringing about a more consolidated effort on the part of all of those engaged in this industry in the country. Colorado welcomes this splendid opportunity of being host to its friends, and we look forward to the coming meeting with great expectation and hope for real accomplishment."

Mechanization Trends

(Continued from page 56)

meeting of the Program Committee for the annual Coal Convention and Exposition; and simultaneously with the conference, the Manufacturers' Section of the Coal Division held their semi-annual meeting of their Board of Governors.

An informal dinner was given to the members who attended the conference. Ray Ulrich, Bethlehem Steel Company, acted as informal toastmaster, and while no serious subjects were presented, there were a number of interesting topics discussed.

The conference is an indication of the growing interest in modernization of coal mining methods, practice and equipment. Members of the committees are enthusiastic concerning the future of the work, and great impetus was given the committee project.

● **ORDERS** received by the General Electric Company during the year 1935 amounted to \$217,361,587, compared with \$183,660,303 during 1934, an increase of 18 percent, President Gerard Swope recently announced.

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The Manufacturers Viewpoint

● **CENTRAL FOUNDRY COMPANY** announces the removal of its Pacific coast sales office from San Francisco to Oakland, Calif., 278 Fourth Street. Mr. John Ponsaing, district sales manager, and Messrs. E. A. Keithley and K. P. Hughes, sales representatives for the company's universal pipe, NUHUB soil pipe, valve service and roadway boxes, solus oil and gasoline separators, and railroad brake shoes, will make their headquarters at this new office.

● **A NEW** line of combination magnetic switches introduced by the General Electric Company, Schenectady, N. Y., with maximum ratings of 25 horsepower at 220 volts and 50 horsepower at 440 volts to 600 volts parallels, but does not supersede a G-E line of similar ratings incorporating a magnetic switch with overload relays for motor running protection, all in the same enclosing case.

● **DURING** the past few months the American Foundry Equipment Company, 555 Byrkit Street, Mishawaka, Ind., have expanded their plant facilities and services for their customers.

This has been brought about by the vast increase in business caused by the demand for the American wheelabrator—the airless abrasive cleaning equipment, as well as the other products of the company which are: American sand cutters, American dustube collectors, feather-weight, and other flasks, pouring jackets, rapid core machine, rod straightener and shear, and other abrasive blast equipment.

Modernization of the entire plant, the addition of a large building for assembly and shipping facilities, and the improvement of their foundry, as well as the expansion of the entire organization and the employment of considerably more labor, were announced by Mr. Otto A. Pfaff, vice president and general manager of the company.

● **"OLD AGE WITHOUT DEPRECIATION"** is the theme of the broadside "Performance," issued by the Cleveland Worm & Gear Company, Cleveland, Ohio.

● **A NEW** publication on abrasion resisting steel has just been published by the Carnegie-Illinois Steel Corp. Copies are available upon request to their Pittsburgh, Pa., office.

● **E. J. LONGYEAR COMPANY** announce that Mr. J. P. Bonardi, General Motors Building, 1775 Broadway, has been appointed sales representative in New York City.

● **THE Westinghouse Electric & Manufacturing Company** reports net earnings in 1935 of approximately \$12,000,000.

● **IN ORDER** to reduce the loss of life due to haulage accidents in coal and metal mines, the Portable Lamp and Equipment Company, of Pittsburgh, Pa., has recently developed three new appliances which are calculated to take their places along with closed lights and protective caps and hats as outstanding contributions toward greater safety in the mining industry. The new safety devices are a mine car stop, a mine car skid, and a mine car derail.

Three new pieces of literature amply describe these devices: Bulletin No. 103 shows the mine car stop in use. In order to reduce haulage accidents to a minimum, the Portable Lamp and Equipment Company recommends that stops be used in all working places and for holding loaded and empty cars on side tracks.

Bulletin No. 104 describes Portable's new mine car skid which serves as an automatic, external brake. The mine car



wheel rides upon the skid member, which slides along the rail. Frictional resistance reduces the velocity of the runaway car or trip and brings it to a complete standstill or greatly diminishes the damaging effect of the derailment.

Bulletin No. 105 describes Portable's new mine car derail which was developed as a companion device to the stops and skids. It is a two-way unit and designed to derail a runaway from either direction.

All three of these new devices are made of high tensile strength malleable iron and can be quickly and easily installed. In order to reduce the cost of installation and facilitate ease in handling, they are designed so that the bases are interchangeable.

Copies of the new literature will be sent gratis to all interested officials.

● **ANNOUNCEMENT** is made that Link-Belt Company has moved their district sales office in St. Louis, Mo., from 3638 Olive Street to 1018-21 Louderman Building, 317 N. 11th Street. Mr. Howard L. Purdon is district sales manager.

● **INTERSTATE EQUIPMENT CORPORATION** announce the installation of a slate disposal aerial tramway for the Mather Collieries, at their Mather, Green County, Pa., mine. This installation will be approximately 1,600 feet in length and equipped with two self-dumping tram-cars of 100 cubic feet capacity each. A tail tower of 250 feet in height will be installed to provide disposal area for many years. The maximum capacity of the tramway will be 256 tons per hour of run-of-mine refuse.

● **THE** nineteenth convention of the Technical Section, Explosives Department, E. I. du Pont de Nemours & Co., was held at Wilmington, Del., January 14, 15, and 16. Arthur La Motte, manager of the section, presided. Addresses were made by Lamot du Pont, president of the du Pont Company; J. Thompson Brown, a vice president; E. B. Yancey, general manager; and P. J. Kimball, director of sales, Explosives Department. Nearly 300 problems relating to commercial explosives and their uses, blasting accessories, and other topics, were discussed by the 130 du Pont men in attendance. Particular attention was given a wide range of applications of explosives to mining, quarrying, and highway and other construction. Those present included executives of the Explosives Department, the staff of the home offices of the Technical Section, technical field men from all parts of the country, plant managers and explosives chemists.

● **THE** new ABC series of Sullivan Slushing Hoists is described in a 12-page, two-color bulletin just issued—No. 76-Y. These hoists with exceptional endurance and pull—minimum size and weight—set new records in ore-moving, rock tunnel loading—surface scraping. Can be mounted on timber skid—loading slide or ramp. Fit any operating position. Motor either right or left. Slide operating or behind-the-drum controls. Ample safety devices. Inspection of all internal parts can be made quickly with hand labor on the spot; 7½ to 50 horsepower. Also Class "R" hoists—100 and 125 horsepower. Class "S" hoists, 125 to 150 horsepower. Electric-turbine-Diesel-gasoline drive. Ask for bulletin 76-Y, Sullivan Machinery Company, 1600-B Bell Building, Chicago, Ill.

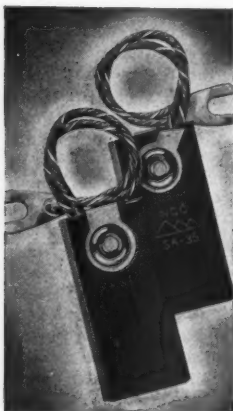
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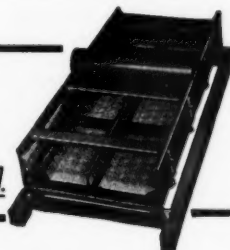
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-
- Minerals are found in every State in the Union.
 - There are 3,071 counties in the United States, and 2,024 of them are substantial mineral producers. The manufacturing industries in the remaining 1,047 counties are largely dependent upon minerals for their existence.
 - 25-million persons, directly or indirectly, are dependent upon the production and fabrication of minerals.
 - 1-million 700-thousand persons are employed in the mines.
 - The annual wage bill of mining is approximately 1-billion dollars.
 - Minerals furnish between 60 and 70 percent of the national wealth.
 - Products of the mines furnish 55.9 percent of the tonnage freight handled by Class I railroads.
 - Normally the mines spend 350-millions of dollars for operating supplies and equipment.
 - In 1935 (admittedly a bad year for mining) 50 representative producers, representing copper, lead, coal, iron, gold, and zinc, spent more than 25-millions of dollars for operating supplies alone, and an even greater sum for capital charge expenditures.
 - In the last 10 years one major coal field, producing less than 100-million tons annually, spent for modernization equipment approximately 40-millions of dollars; they further spent approximately 8-millions for mechanical cleaning plants.

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The Disregard of the Supreme Court, and the Undermining of the Principles of the Constitution which have been the bulwark of our Progress.

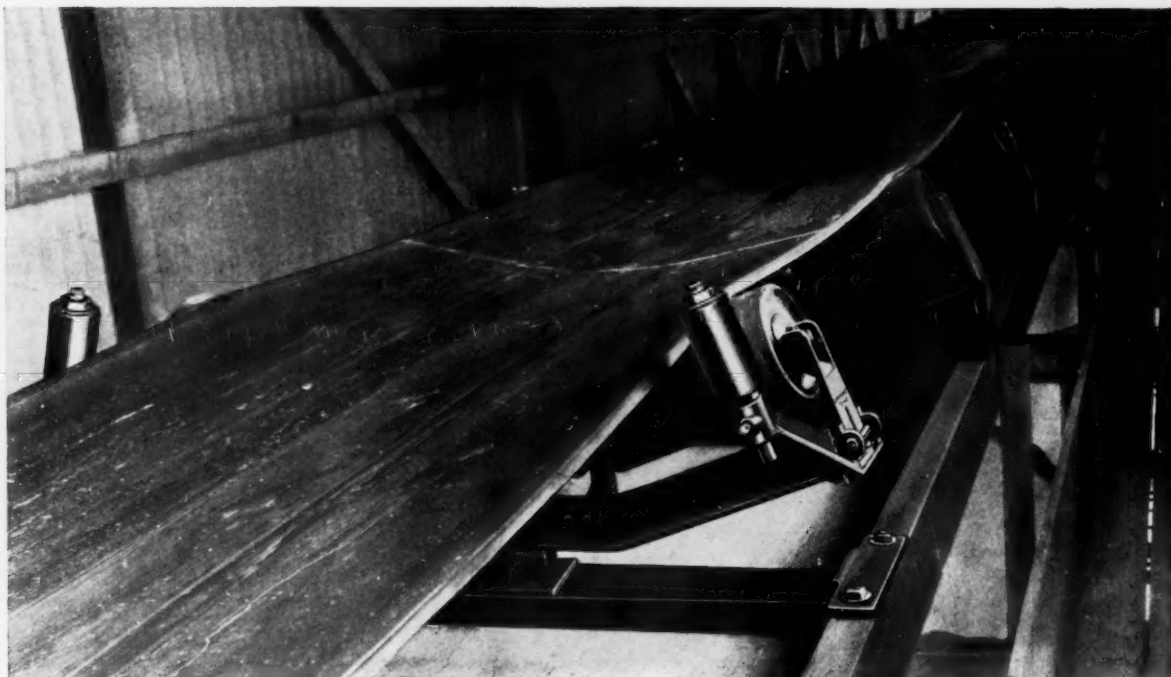
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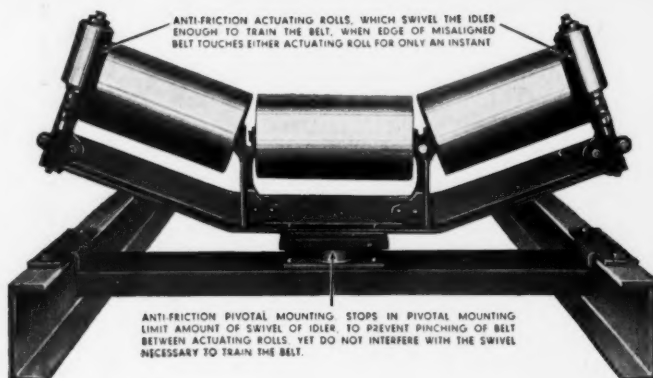
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